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ABSTRACT

Subject information, course instructions, and resource materials for a television course, "Man and Environment," are compiled in this student study guide. The interdisciplinary, modular course emphasizes the importance of such concerns as destruction of the environment and the declining quality of life while educating the public about the life-threatening problems that exist in both our physical and cultural environments. Solution of environmental problems, individually and collectively, is encouraged. The guide attempts to coordinate material from the basic textbook and TV documentaries used in the course. Fifteen modules which constitute the course are titled: environmental imperatives; nature of man; value systems--ecological imperatives; concepts of change; earth as an energy system; conservation of vital resources; population dynamics; urbanization--the living community; air pollution; water--supply, demand and pollution; scenic pollution; food and drug pollution; sound pollution; individual involvement; and responsibility to future generations. Each unit of study emphasizes seven points: (1) an overview of the module, (2) main ideas contained in the unit, (3) key terms, (4) things to look for in the text and TV documentary, (5) guiding questions to review the material and provide thought-provoking exercises, (6) involvement activities, and (7) an annotated bibliography/additional reading list. Related documents are ED 056 930 and SE 015 175. (BL)

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STUDY GUIDE

Man AND Environment

Volume One

SE 015 174

ED 071855

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This Study Guide is based largely upon material produced during the 1971-1972 academic year by Miami-Dade's TV College staff under the leadership of Dean Horace Traylor and his colleagues: Karen Bruner, Laurence Chernoff, and Virginia Gentle.

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1972

STUDY GUIDE

MAN AND ENVIRONMENT

VOLUME ONE

TABLE OF CONTENTS

General Instructions

Module I . . . . . Environmental Imperatives

Module II . . . . . Nature of Man

Module III . . . . . Value Systems -- Ecological Imperatives

Module IV . . . . . Concepts of Change

Module V . . . . . Earth As An Energy System

Module VI . . . . . Conservation of Vital Resources

Module VII . . . . . Population Dynamics

Module VIII. . . . . Urbanization -- The Living Community

Module IX . . . . . Air Pollution

Module X . . . . . Water -- Supply, Demand & Pollution

Module XI . . . . . Scenic Pollution

Module XII . . . . . Food and Drug Pollution

Module XIII. . . . . Sound Pollution

Module XIV. . . . . Individual Involvement

Module XV . . . . . Responsibility to Future Generations

Appendix A. . . . . Annotated List of Regional and National Environmental Action Organizations

Appendix B. . . . . Annotated List of Federal Agencies Concerned with the Environment

GENERAL INSTRUCTIONS

Preliminary Comments

Environment is one of the key words of our time. It was made so by growing public recognition that the quality, and indeed the existence, of life on earth is closely connected to the condition of the environment. The presentation of this course is an attempt to emphasize the importance of these concerns and to further educate the public about the life-threatening problems that exist in both our physical and cultural environments. The course is also designed to assist the learner to work toward the solution of environmental problems, individually and collectively.

Man and Environment is a general education, interdisciplinary, modular course. General education courses are those intended to give a student a well-rounded background in the various aspects of the world in which he lives. The fact that this course is termed "general education" should emphasize that it is very important in any educational program. "Interdisciplinary" indicates that the material to be presented here is not just biology, or sociology, or geography, but an integration of subject matter areas into a course that will draw on many disciplines. Materials will be presented in self-contained units of study called "modules." Although all modules do relate to one another, each module focuses on a particular environmental problem area.

The course was outlined at a workshop held in May, 1970, in Denver, Colorado, and attended by representatives from universities and colleges across the country. It was revised and expanded at a subsequent workshop in November, 1970, in Las Vegas, Nevada, and at a series of follow-up evaluation sessions held at Miami-Dade Junior College, during the 1971-1972 academic year. Since that time, the course has been adopted by many colleges across the United States.

R E A D C A R E F U L L Y

The Purpose of the Study Guide

The primary purpose of this study guide is to assist you in understanding the main ideas presented in this course.

The format of the course may differ from one institution to another, but it is assumed that each institution will use the same two primary sources -- the textbook Man and Environment and the TV documentaries produced by Miami-Dade Junior College. This study guide, therefore, will attempt to assist you in coordinating the basic material presented in these two documents. Instructors at your institution may add supplementary materials to this basic package. In this event, you should expect further instructions on the use of additional materials from your local institution.

The Textbook MAN AND ENVIRONMENT

ABOUT THE BOOK: The basic textbook for this course is Man and Environment, edited by Drs. Robert H. McCabe and Robert Mines of Miami-Dade Junior College. However, you will note that several persons from other institutions have written various chapters in the text. Furthermore, the main ideas contained in the text and documentary have been reviewed by a group of national consultants who are authorities in their respective fields. A list of these individuals appears in the front of your study guide.

SUGGESTIONS FOR USAGE: First, you should look the book over and become familiar with its general content and structural organization. You will note that Chapter I, "Environmental Imperatives," lays the basic foundation for much of the remainder of the course. Chapter XIV, "Individual Involvement," and Chapter XV, "Responsibility to Future Generations," are the culminating chapters of the text. Perhaps you should like to read these sections before formally commencing the course. In any event, you should always read the appropriate chapter carefully before viewing the TV documentary dealing with each particular modular topic. Use your study guide as directed below to assist you in understanding the materials.

SUGGESTIONS FOR VIEWING THE TV DOCUMENTARY

Review the appropriate module in your study guide before viewing the TV documentary. Also, make certain your TV set is in good working condition, and be sure to schedule the times for the TV classes so that you will not be distracted during the presentation. Do not attempt to do other things while you are viewing the documentary; it needs your full attention. Keep paper and pencil handy so you can take notes during the presentation. You may wish to

READ CAREFULLY

write comments in your study guide while watching the documentary, or you may choose to do so immediately after the program. If you own a tape recorder, you may wish to tape the audio portion of the presentation. You will find a recording useful during the remainder of the course. In any event, be sure to review your study guide prior to and after watching the TV documentary. It will be far easier to respond to the activities under the sections "Things to Look For" and "Guiding Questions" immediately after reading your chapter and viewing the documentary.

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How to Use Your Study Guide Effectively

OVERVIEW - Read this introduction carefully, and reexamine the concluding comments in each chapter of the text. These two sections contain the focus of the module.

MAIN IDEAS CONTAINED IN THE UNIT - Review this section carefully since these points summarize the major concepts dealt with in the textbook and in the TV documentary. Familiarize yourself with these main ideas and keep them in mind when reading the appropriate chapter in the textbook and viewing the TV documentary.

KEY TERMS - Although all the technical terms used in the text and the TV documentary are not listed, these terms should be of assistance in helping you to understand the material dealt with in the module.

THINGS TO LOOK FOR - Obviously this section of the study guide can not cover all the material which you should become familiar with in the module. However, it is designed to emphasize some of the major highlights of the text and TV documentary. Note-taking space is provided for your convenience.

GUIDING QUESTIONS - These questions are designed for two primary purposes: (1) to assist you in reviewing the material in the module; and (2) to provide you with thought-provoking exercises to help you measure your grasp of the subject matter. You should make every attempt to answer as many of the questions as your time allows. Space is provided for note-taking under the essay questions, and a key to the multiple choice questions is provided at the end of the module. Information regarding formal tests and other means of evaluation will be supplied to you by your course instructor. These guiding questions should assist you in preparing for your formal exams. If you cannot answer a question, go back and review the text

and your notes. In the event that you are still unable to answer the question, do not hesitate to consult your instructor.

INVOLVEMENT ACTIVITIES - This section attempts to emphasize the primary objective of this course: environmental action. It attempts to suggest various opportunities in your home and in your community where you can become personally involved, both individually and collectively, in ways to improve the quality of the environment. We do not expect you to join every community group concerned with environmental affairs, or to become involved in every issue. We do hope, however, that you will not feel you have adequately benefited from this course without some personal commitment.

ANNOTATED BIBLIOGRAPHY - This section of the module contains an additional reading list. You should make every attempt to read at least one book or periodical for each module in addition to your chapter text. This bibliography will introduce you to a great deal of basic literature dealing with man and the environment. For further reading suggestions, consult your course instructor.

APPENDIX A - This section consists of an annotated list of regional and national environmental action organizations. You should become acquainted with several of these organizations and relate their work to the material dealt with in the various modules and especially to the involvement activities.

APPENDIX B - Appendix B is an annotated list of federal agencies concerned with the environment. You should become acquainted with several of these agencies and relate their work to the material dealt with in the various modules and especially to the involvement activities.

GOOD LUCK!

WE HOPE YOU ENJOY THE COURSE

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ENVIRONMENTAL IMPERATIVES

Behind the complex predictions and obscure language, beyond words like ecology, environment and pollution, there is a simple question, Do we want to live or die?

---Mayor John V. Lindsay

OVERVIEW

Current environmental conditions present a threat to both the quality of life and the existence of numerous plant and animal species, and hence the world's entire ecosystem. There is but one earth, and its life supporting resources are finite. Man is an integral part of his environment, and cannot escape the consequences of an unwise use of the earth's resources, or of a possible breakdown in the earth's delicately balanced ecosystem. Values and attitudes influence man's life style and thereby the utilization of the earth's resources. If man is genuinely concerned with the questions of his own survival and improvement in the quality of human life, rational environmental planning is imperative and must begin immediately.

MAIN IDEAS CONTAINED IN THE UNIT

-- Man is vulnerable. He can be destroyed by his own ignorance regarding the nature of the environment.

-- Man is an integral part of the environment, and consequently dependent upon it for survival.

-- The resources of the earth are finite, and for all practical purposes subject to exhaustion by human consumption. Consequently, man must plan for the intelligent use of the earth's resources.

-- Man's value systems, attitudes, and life styles are at the core of his environmental problems. He must consider whether a continuation of his present values, attitudes, and life style are worth the costs to himself and his species.

KEY TERMS

-- Critical Stress represents a point where any additional stress to the system causes the whole system to break down.

KEY TERMS (continued)

-- An Ecosystem is the network of intricate interrelationships which exist among the various organisms occupying a given environment and their interaction with the physical aspects of their environment. The term is also used to refer to the entire network of intricate interrelationships existing among the various organisms living on the planet Earth.

-- The Population Bomb is a popular term which refers to the threat from the rapidly accelerated increase in the world's population which has taken place during the past few generations.

-- Spaceship Earth - This phrase expresses the idea that the earth is a tiny fragile spaceship orbiting the sun and that man depends upon its resources for the support of his life. Spaceship Earth is virtually a closed system.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- Observe the ways in which man is interdependent with the total environment.

_____

_____

_____

-- Is there any real evidence of an environmental crisis? Explain.

_____

_____

_____

-- In what ways has Western man's value system contributed to the current environmental crisis?

_____

_____

_____

THINGS TO LOOK FOR (continued)

In the TV Documentary:

-- Observe the impact of science and technology on man's ability to radically influence his environment.

_____

_____

_____

-- What is the apparent relationship between science and technology and the idea of progress -- including the consequent impact on the environment?

_____

_____

_____

GUIDING QUESTIONS

Essay (Space provided for notes.)

-- In what respect has man's behavior differed from that of other species to make possible the present threat of overpopulation?

_____

_____

_____

-- In what respects is the current era different from the one in which Western man's value system regarding the environment was formed?

_____

_____

_____

GUIDING QUESTIONS (continued)

-- List several examples where the "law of critical stress" appears imminent in the current American environment.

_____

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_____

-- How does an increase in the population of one nation have an effect on all nations? Can you relate your answer to the earth's ecosystem and to the stated Environmental Imperatives?

_____

_____

_____

Multiple Choice (Key follows Annotated Bibliography.)

1. The unique characteristic of man is

   a. a prehensile hand with an opposable thumb which permits grasping.
   b. an upright posture
   c. an S-curved spine
   d. a slow maturation period
   e. the power for abstract thought and reasoning.

2. Many current environmental problems posing threats to man's very survival result directly from man's short-sighted intrusion into the delicately balanced ecosystem. Which of the following represents an exception?

   a. Massive pollution of water and air.
   b. The development of a value system emphasizing the production and possession of more and more material goods.
   c. Wasteful exploitation of the earth's natural resources.
   d. Attempts to control the population explosion.
   e. Reliance on science and technology as a panacea for all human problems.

INVOLVEMENT ACTIVITIES

-- Explore your community, campus, or place of employment and make a list of environmental problems you perceive.

-- Explain the concept of an ecosystem to some of your friends or neighbors.

-- Discuss ways of dealing with the problems of water and air pollution with your classmates or members of a civic club or organization.

-- Read a book from the bibliography or talk with some knowledgeable individual regarding the question of individual rights versus societal rights.

-- Make a list of things that you feel you can do as an individual to make people more aware of the immense environmental problems with which man is faced at the present.

-- Join an environmental organization working for air and/or water pollution control.

ANNOTATED BIBLIOGRAPHY

Borman, F.H., and Likens, G.E. "Nutrient Cycling." Environmental Insight. Edited by Robert M. Chute. New York: Harper and Row, 1971. Pages 49-61.

A general discussion of nutrient cycles within a terrestrial ecosystem. The authors also draw attention to research concerning small watersheds.

Commoner, Barry. "The Ecological Facts of Life." No Deposit-No Return. Edited by Huey D. Johnson. Menlo Park, California: Addison-Wesley Publishing Company, 1970. Pages 18-35.

This article elaborates upon the following facets of ecosystem: its origins, basic properties and the impact of human intrusions. The author also discusses the economic benefits and ecological hazards of technology.

Leopold, Aldo. A Sand County Almanac. New York: Oxford University Press, 1966.

The most eloquent and influential statement of the need for an environmental ethic in American letters. Integrated with his observations as a field ecologist, Leopold's philosophy is an essential component of any environmentalist's perspective. Also suitable for the unit on "Responsibility to Future Generations." High school and beyond.

Nash, Roderick, ed. Environment and Americans: The Problem of Priorities. New York: Holt, Rinehart and Winston, 1972.

A collection of statements concerning the American relationship to nature from the Indian to the ecologist. Also suitable for the unit on "Value Systems." College level.

Key to multiple choice: (1) E, (2) D

THE NATURE OF MAN

Man is the only animal that laughs and weeps; for he is the only animal that is struck with the difference between what things are and what things ought to be.

--William Hazlitt

OVERVIEW

The materials in this module focus on those characteristics of man which are common to other life forms as well as those attributes which are solely unique to him. We shall examine how his attitudes and behavior toward himself and toward his environment have been influenced by his culture and how they have led to his ability to modify the environment.

MAIN IDEAS CONTAINED IN THE UNIT

-- Man is first a biological creature and therefore has many biological characteristics in common with other organisms. His survival is subject to his biological limitations.

-- Man is a unique animal exhibiting some characteristics not common to other living things, e.g., a highly developed cerebrum, which has led to the development of highly complex cultures.

-- Man has evolved through the continuing process of natural selection, whereby those species which cannot adapt to changes in the environment perish.

-- Man's attitudes and behavior towards himself and towards his environment are influenced by his culture. Through his biological and cultural adaptations, as well as his technologies, he has developed the ability to modify his environment for better or for worse.

KEY TERMS

-- Adaptation is the result of a sequence of changes that allows an organism to adjust to altered conditions of the environment. It also refers to the process of adjusting to altered conditions. It should be understood that organisms and species do not necessarily have the capacity to adapt to a new condition.

KEY TERMS (continued)

-- The Cerebrum is the area of the brain that deals with voluntary action. It also is the center of information storage and retrieval and is most highly developed in man. Its high degree of development permits advanced abstract thought.

-- Natural Selection is a process by which various factors in the environment cause the reproductive removal of individuals from a population thus allowing adapted individuals to survive and reproduce and pass these traits on to the offspring.

-- Social Institutions are those organization developed as a means of ordering human behavior in an integrated manner in order to satisfy basic needs, or to achieve common goals: e.g., church, school, government, and family.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- What are the biological commonalities between man and other animal organisms?

_____

_____

_____

-- Note the process of natural selection.

_____

_____

_____

-- What are the unique characteristics of man?

_____

_____

_____

THINGS TO LOOK FOR (continued)

In the TV Documentary:

-- What is the role of adaptation in the evolution of man?

_____

_____

_____

-- What is the function of words and symbols as part of the culture of man?

_____

_____

_____

-- Note the formation of the permanent family group.

_____

_____

_____

GUIDING QUESTIONS

Essay (Space provided for notes)

-- According to Darwin, what do common developmental stages indicate?

_____

_____

_____

-- What are the selective factors influencing natural selection?

_____

_____

_____

GUIDING QUESTIONS (continued)

-- What information is provided by fossils of extinct forms?

_____

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_____

-- What are some of the characteristics of man that influence the modifications that he makes in his environment?

_____

_____

_____

-- In terms of what you know about the biological nature of man, what relationship exists between his biological nature and his propensity to build cultures?

_____

_____

_____

Multiple Choice (Key follows Annotated Bibliography.)

1. The process that results in the appearance of new life forms, some of which are suited to a different set of environmental conditions, is called

   a. physiological adaptation.
   b. alternation of generations.
   c. natural seclection.
   d. heredity characteristics.
   e. cybernetics.

2. A man is the sole survivor in a plane crash. He is in an isolated spot and is at the mercy of the elements. If he is to survive, he will probably have to

   a. rely heavily on his basic instincts.
   b. prepare a careful inventory of assets available to him.
   c. use his learned experience to modify his surroundings.
   d. change himself to meet environmental conditions.
   e. develop natural devices to defend himself.

INVOLVEMENT ACTIVITIES

-- There are two possible extreme ways of looking at the nature of man. One is not so optimistic as the other. Interview a member of the clergy, a philosophy professor, or any other person you so wish who you believe might be able to enrich your thinking on this topic.

-- Ask your parents how they have responded to environmental change over the decades. Compare their responses with those of other members of your community.

-- Looking back in your own life, have there been any fundamental changes in your attitudes? List these changes and attempt to account for the change of view.

-- Assume you could establish a value structure of your very own or refine our present standards of behavior and beliefs. What recommendations would you suggest?

ANNOTATED BIBLIOGRAPHY

Ardrey, Robert. The Territorial Imperative: A Personal Inquiry Into the Animal Origins of Property and Nations. New York: Atheneum Press, 1968.

The author "focuses on the instinctive behavior of many animals toward portions of their habitat, which they defend against threat from intruders." Ardrey surveys scientific findings concerning other species in order to show that man's territorial instincts are neither unique in the animal world nor the result of social customs. His central theme is that "our attachment for property is of an unlearned biological order" similar to the territorial behavior of many other species.

Hardin, Garrett. African Genesis. New York: Atheneum Press, 1961.

Interprets the animal origins and the nature of man. A controversial, provocative book full of important insights into human behavior. High school and beyond.

Freeman, W. H. Population, Evolution, and Birth Control. W.H. Freeman and Company, 1969.

A good collection of readings on population and birth control which represents both historical and philosophic perspectives.

Annotated Bibliography (continued)

Morris, Desmond. The Naked Ape. New York: McGraw-Hill, 1967.

A zoologist's view of man as an animal. Readable, entertaining, yet important as a key to human conduct. High school and above.

Vlahas, Olivia. Human Beginnings. New York: Viking Press, 1966.

An overview of the evolution of man and the development of culture. Contains a good bibliography for further study.

Key to multiple choice: (1) C, (2) C.

VALUE SYSTEMS -- ECOLOGICAL IMPERATIVES

> Every time a value is born, existence takes on a new meaning; every time one dies, some part of that meaning passes away.
>
> -- Joseph Wood Krutch

OVERVIEW

Value systems are rooted in man's organic nature and result from a particular group's experiences. In any given society people value the things which they consider worthwhile. Since values are based on felt needs of varying intensity. contradictions and conflicts often result. For example, in modern industrial societies man has tended to place a high premium on science, technology, and material possessions at the expense of the natural environment of which he himself is an integral part. If man is genuinely concerned with his own survival, he must reorganize his value system placing environmental imperatives above the utilization of the earth's resources for the satisfaction of short-term transitory desires. Values need to be clarified if we are to remove inconsistencies in our lives.

MAIN IDEAS CONTAINED IN THE UNIT

-- Value systems are based on man's accumulated experiences in satisfying his basic organic needs while living in organized societies.

-- Value systems identify ideas or objects of major importance in any society and therefore predispose its members to behave in certain ways toward those ideas or objects.

-- Values held by members of a complex society are often in conflict rather than in harmony. It is necessary, therefore, for a society and its members to arrange their values in some hierarchical order.

-- Much of the current environmental crisis results from the fact that modern Western man has placed an exceptionally high value on science, technology and the production and possession of material goods.

MAIN IDEAS CONTAINED IN THE UNIT (continued)

-- Values are deeply rooted in a given people's cultural heritage; though, like all things, values are subject to change. Modern industrial societies must closely reexamine their values to insure that any modification will reflect the interrelatedness of man and his environment.

KEY TERMS

-- A hierarchy of values is an arrangement whereby values are organized on a basis of relative priority to an individual or a group.

-- Values are things in any given society toward which people have an affective regard: ideals, customs, and ways of life which the members of a given society consider worthwhile.

-- Value orientation is a term used to refer to the significant objects or ideas toward which an individual or a group is inclined: the tendency of an individual or a group to look favorably upon certain objects, ideas, or ways of life.

-- A Value System is the combination of the various values shared by any given group, arranged in a particular configuration. This pattern may vary from one group to another.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- Observe the relationship between this country's "high standard of living" and present environmental conditions.

_____

_____

_____

THINGS TO LOOK FOR (continued)

-- Review the examples of conflicts in America's value system dealt with by the author.

_____

_____

_____

-- Note the influence of technology on American values.

_____

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_____

In the TV Documentary:

-- Make sure you understand the definition and explanation of values.

_____

_____

_____

-- Observe that limitations exist on the use of science and technology to solve human problems.

_____

_____

_____

-- Why do people "establish and accept a hierarchy of values"?

_____

_____

_____

GUIDING QUESTIONS

Essay (Space provided for notes.)

-- Why are values important to study in a course on the environment?

_____

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_____

-- What are some of the "belief and value orientations" which underlie the affluence and abundance of modern America?

_____

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_____

-- Your textbook asserts that "a central concern in American life has undoubtedly been upon personal achievement." Does he support this statement? Give examples.

_____

_____

_____

-- Your textbook lists several examples of conflict in the American system of values. List some good examples.

_____

_____

_____

Multiple Choice (Key follows Annotated Bibliography.)

1. The current environmental crisis has resulted most directly from

   a. the applications made of science and technology.
   b. the slow development of science and technology.
   c. the lack of a well integrated system of values.
   d. a low utilization of the earth's natural resources.
   e. man's ability to establish mastery over his environment.

2. According to the chapter on value systems, environmental problems will most likely have which of the following effects on the youth culture and over-thirty culture?

   a. Further dividing them because the problems are seen as more serious by youth than by those over thirty.
   b. Further dividing them because the problems are seen as more serious by those over thirty than by youth.
   c. Further dividing them because of a difference in values and methods.
   d. Bringing them together in a common cause.
   e. Bringing them together despite the youth culture's disinterest in these particular problems.

INVOLVEMENT ACTIVITIES

-- Prepare a list of the values of several groups in your community. Which of these groups are the most sensitive to environmental imperatives?

-- Make a list of persons you know who seem indifferent toward personal achievement.

-- Prepare a list of your own values and arrange them in hierarchical order.

-- Develop an ideal set of values designed to promote "the good life" and alleviate the current environmental crisis.

-- Talk with some elderly people and see what changes in values they have observed during the past generation, especially with regard to the environment. Contrast these values with those held by people of your generation. Find out how they have coped with a changing society.

ANNOTATED BIBLIOGRAPHY

Dixon, J. P. American Association for the Advancement of Science, Air Conservation Commission. Air Conservation. Publication 80, 1965.

This book is perhaps the best single source on air pollution. The volume covers not only scientific considerations of the problem, but it also devotes a sizeable number of pages to the economic, political and sociological implications of air pollution.

Lane, L. W., Jr. "An Environmental Ethic." No Deposit-No Return. California: Addison-Wesley Publishing Company, 1970. Pages 223-229.

This informative article focuses on the need for a code of ethics to guide human behavior in relationship to the environment. It discusses additionally the ways by which we can now reassess our national values and goals.

Pauline, J. Lawrence and Weishaus, Howard. "Cost of a Program of Ecological Reform." Ecology. New York: Oxford Book Company, 1971. Pages 196-206.

The authors discuss the financial costs involved in environmental reform. Their discussion focuses in particular on choices that must be made by the American public. These choices are value judgments and may impinge on the "personal rights" of citizens.

Key to multiple choice: (1) A, (2) D.

CONCEPTS OF CHANGE

All is change; all yields its
place and goes.

--Euripides

OVERVIEW

The materials in this module focus on what change is, rate of change, how man adapts to change, and how man's concepts of change relate to his environmental problems. The module will examine the way in which the rate of change in society is gaining momentum at an accelerating pace, and how many of these changes have had serious consequences for man and the environment.

MAIN IDEAS CONTAINED IN THE UNIT

-- Change is present in any given era, and the rate of change is accelerating rapidly in the modern world.

-- Education is a life long process that must be utilized for individuals to cope with our rapidly changing environment.

-- Man has a deep-rooted resistance to change, which interferes with his adaptability to a rapidly changing environment.

-- Man needs to re-evaluate his attitudes about the nature and rate of change if he is genuinely concerned about the quality of his environment and his life.

-- Western society tends to view change as synonymous with progress.

KEY TERMS

-- Acculturation is the process by which groups of individuals having different cultures adapt to the behavior patterns of one another.

-- Cultural lag describes the phenomenon whereby different societies (or different institutions within a given society) do not change at the same rate. This unevenness permits time, as a standard, to be applied in measuring social changes which take place in different societies or among different groups within any given society.

KEY TERMS (continued)

-- Enculturation refers to the process by which individuals, from birth to death, adapt to the behavior patterns of individuals around them. The term socialization is frequently used interchangeably with enculturation.

-- Industrial Revolution - The Industrial Revolution, one of the most pronounced changes in history, led man to acquire a whole new life style. The term generally refers to a series of changes which took place in methods of production during the eighteenth century, especially in England and Western Europe. The term includes such innovations as the invention of the steam engine, improvement in spinning and weaving, and the application of steam as a source of power to the means of production and locomotion. New working skills, new patterns of authority and new methods of communication resulted from the basic change. These changes, in turn, created the setting for other historical revolutions --- especially, the Agrarian and the Urban.

THINGS TO LOOK FOR (Space provided for notes.)

In the Textbook, Man and Environment:

-- Carefully read the author's views on the present and future implications of change.

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-- Observe the distinction between the processes of enculturation and acculturation.

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-- Note the impact of the Industrial Revolution on the environment.

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THINGS TO LOOK FOR (continued)

In the TV Documentary:

-- Note the relatively rapid rate of progress in a technological society.

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-- Review the concepts of change and their possible implications for society.

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GUIDING QUESTIONS

Essay (Space provided for notes.)

-- How does the present rate of change differ from change of past eras?

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-- What has been the basis for most change throughout the course of history?

_____

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-- When does change not constitute progress?

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GUIDING QUESTIONS (continued)

-- Describe the phenomenon of cultural lag.

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--What changes resulted from the Industrial Revolution?

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-- What is the effect of changes over the past 200 years on the quality of the environment?

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Multiple Choice (Key follows Annotated Bibliography.)

1. On the basis of your textbook, the most justifiable statement regarding change would seem to be:

   a. Change is initiated and directed by a Supreme Being.
   b. Change is caused by forces beyond man's control.
   c. Change is relatively easy to analyze.
   d. The future course of events is readily predictable.
   e. In the long-run, change is virtually certain.

2. As a result of the Industrial Revolution and the urban movement which followed, different psychological outlooks of life resulted. One theme in particular began to dominate man's thinking --

   a. the great ability of man to use the natural resources of the earth to his own advantage.
   b. the great ability of man to better understand the validity of traditional values.
   c. the intrinsic superiority of land as a form of wealth.
   d. the inability of man to change his physical environment.
   e. the great ability of man to solve the world's social problems.

INVOLVEMENT ACTIVITIES

-- Set aside an evening to spend with a group of friends or relatives to discuss major social economic and political changes that have taken place within the last few decades.

-- Read a book on the Industrial Revolution and observe basic changes resulting from the shift from an agrarian to an industrial society.

-- Spend some time with a group of interested friends or colleagues discussing the possible social, economic and political consequences resulting from the present rapidly accelerating rate of change.

-- Interview a person over sixty-five years of age. Discuss changes in life styles he has experienced and/or observed.

ANNOTATED BIBLIOGRAPHY

Cousins, Norman, et al. Freedom to Breathe. Report of the Mayor's Task Force on Air Pollution in the City of New York, 1966.

This report includes a discussion of the problem in New York and a suggested program for cleaning up the air. It also includes a good review of the literature concerning mortality and morbidity in both the United States and abroad.

Hoffer, Eric. The Ordeal of Change. New York: Harper and Row, 1963.

The author considers a variety of subjects from the corrupting power of weakness to the influence of simple recreational play on the development of civilizations. The major concern of the book is directed toward the individual's reaction to drastic social and political upheavals. Eric Hoffer develops the central thesis that man resists change and does not adapt to it readily.

Toffler, Alvin. Future Shock. New York: Random House, 1970.

A probing book which examines the consequences for man of rapid and far-reaching change.

Key to multiple choice: (1) E. (2) A.

EARTH AS AN ENERGY SYSTEM

Sad soul take comfort
nor forget
That sunrise never failed
us yet.

--Celia Thaxter

OVERVIEW

This module examines the energy system of which earth is a part and breaks the earth as a system into four subsystems -- atmosphere, lithosphere, hydrosphere, and biosphere. All are interrelated and energy is transferred within and among them. The module indicates the need for considering energy budgets and energy conservation as primal in realistic environmental planning.

MAIN IDEAS CONTAINED IN THE UNIT

-- Earth is an energy system with dynamic, continually interacting subsystems. Therefore, modifications in one subsystem may induce modifications in others.

-- Energy is essential to all forms of life.

-- As energy transfers take place within the earth's energy system, usable energy is lost at each transfer.

-- Man's increasing cultural demand for more and more energy creates stresses on other critical environmental factors. Men must either find new methods of tapping energy sources that create less trade-off environmental stresses or reduce total energy consumption.

-- Energy flows through the system and is not recyclable.

KEY TERMS

-- Biosphere - The biosphere is one of the major subsystems in the earth's energy system. It is the subsystem consisting of all living organisms. ("Bio" refers to life.) Life is not known to exist in all parts of the earth's energy system. Life (or the biosphere) is most abundant at the earth's surface.

-- Efficiency - This term is used to describe the relationship between the energy output of an energy system. Ideal or perfect efficiency is when energy input is equal to usable energy output. Think of it as a ratio:

$$\frac{\text{Usable energy output}}{\text{energy input}} = \text{efficiency}$$

KEY TERMS (continued)

Most mechanical devices operate at approximately 40% efficiency which means that the balance of the energy put into the system is degraded or wasted. Both physical and biological systems can be assessed in terms of efficiency.

-- The Second Law of Thermodynamics states that in every energy transfer or transformation some energy is degraded into a less usable form, usually heat. Therefore, energy tends to run "downhill". When gasoline is burned in a car, a portion of the energy is dissipated as heat. Once the heat escapes into the environment, it is no longer "available" energy because it is so widely dispersed. This law also tells us, indirectly, that there are limits to what we can expect technology to accomplish in the resolution of environmental problems.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- The introduction and the summary of the chapter are excellent and should be read very carefully. List the main points covered in each.

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_____

-- Note the brief discussions of efficiency that appear on several different pages. It is discussed from both a physical and biological perspective.

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-- Follow the pathways by which energy flows through the biosphere. Of particular importance is the concept of energy requirements for maintaining biological organization.

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_____

-- Review the ways that man taps the earth's energy sources and where disruptions in energy systems are likely to occur.

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In the TV Documentary:

-- Observe the interactions within and between subsystems of the earth's energy system.

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-- In addition to differentiating between kinetic and potential energy, the sequence showing the boy swinging the wrecking ball demonstrates the fact that you cannot get more energy out of an energy transfer than was put in to begin with. Relate this to "efficiency" and the ratio given in key terms.

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_____

-- Re-examine the discussion of earth's energy system as an "open system" -- one that receives a continual energy input. Compare this to the discussion of "closed systems" in the module on air pollution.

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GUIDING QUESTIONS

Essay (Space provided for notes)

-- How is a food chain an "energy system"?

_____

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_____

-- The text states that energy is required to maintain organization. How is energy expended in maintaining "biological organization"?

_____

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_____

-- Environmental problems are sometimes summed up in the statement "There's no such thing as a free lunch." Relate this statements to the Second Law of Thermodynamics.

_____

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-- Solutions to environmental problems often involve "trade-offs," i.e., attempting to find the solution with the least environmental costs in relation to the solution of a particular problem or meeting a particular need. Within this frame of reference, discuss some of the trade-offs involved in meeting man's transportation needs. (Consider man's needs, the rate of energy consumption, and environmental costs.)

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-- What simple way can you think of by which man can tap direct solar energy in order to reduce the rate of consumption of fossil fuels? (Remember that "direct solar energy" is not synonomous with "solar power.")

_____

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_____

Multiple Choice (Key follows Annotated Bibliography)

1. There is only one major process of the earth that is not powered by either sunlight or internal heat. This process is the

   a. pattern of deep ocean currents.
   b. prevailing winds in each of the latitudes.
   c. movement in the outer layer of the lithosphere.
   d. ebb and flow of the tides.
   e. storage of energy in the form of chemical bonds in organic molecules.

2. Which of the following sources of energy is man rapidly depleting?

   a. Fossil fuel power.
   b. Nuclear power.
   c. Solar power.
   d. Geothermal power.
   e. Tidal power.

INVOLVEMENT ACTIVITIES

-- Become informed of future energy sources being planned for your community.

-- Find out what the principal sources of energy are in your community.

-- Clip articles which deal with our energy crisis from your local newspaper as well as national magazines. Read and react to the various points of view expressed.

-- America will face a serious fuel crisis in the not too distant future unless it curtails its rising energy demands or develops new fuel sources. Assume that you have been invited to serve as guest editor of your local newspaper with the purpose of preparing a column on this issue. What major points on this issue will you include in your column?

-- People who advocate the expanding use of nuclear power plants are very optimistic about their potential. They do not believe they pose any appreciable danger to man. However, others equally qualified to judge,disagree categorically. Who is right? Make a survey of your community or local neighborhood in order to obtain the opinions of local citizens on this crucial issue.

-- Organize a weekly informal meeting with your peers and colleagues to discuss the quality of our environment. As one of your topics, you may wish to discuss "How safe are nuclear power plants?"

ANNOTATED BIBLIOGRAPHY

Chute, Robert M., ed. Environmental Insight. New York: Harper and Row, 1971.

This book contains several excellent readings on energy flow. Two are annotated below.

Chute, Robert M. "Ecology". Pages 43-48.
This article describes energy flow through the biosphere, and relates the activity of living organisms to the physical laws that govern energy transformations in non-living systems. It contains excellent diagrams and is college-level reading.

Patterson, Walter C. "Hazards of Radioactive Waste." Pages 130-138.
The author reviews the long-term environmental debate associated with the use of nuclear power to meet man's energy crisis.

Detwyler, Thomas. Man's Impact on the Environment. New York: McGraw-Hill Book Company, 1972.

A collection of interesting essays on the environment. The major focus of the book is on: root causes of the environmental crisis; man's impact on the water, air, and land; and trends and future prospects.

Odum, Eugene P. Fundamentals of Ecology. Philadelphia; M. B. Saunders, Co., 1959.

According to many, this is the best single ecology text. It contains comprehensive coverage of the basic biological principles from which wildlife management is derived.

Key to multiple choice: (1) D, (2) A.

CONSERVATION OF VITAL RESOURCES

There is nothing man cannot make natural;
There is nothing he cannot lose.

---Blaise Pascal

OVERVIEW

The materials in this module examine the nature and status of the earth's vital resources and those pressures exerted on them by the cultural needs of man. The new role of man as resource manager and conservationist, and those methods by which he can utilize the earth's resources more efficiently, are examined. Since the natural resources available to man are limited, great care must be taken to put these resources to the best possible use.

MAIN IDEAS CONTAINED IN THE UNIT

-- Resource management is the intelligent practice of maintenance and preservation of vital resources.

-- Vital resources are classified by the time required for them to regenerate. Some are renewable resources (such as lumber) which regenerate in relatively short periods of time. Others are classified as non-renewable resources (such as metal) since they do not regenerate or they regenerate slowly over millions of years (oil).

-- Man, as a resource manager, must balance ecological considerations with the demands of his value system and life style.

-- Some important operational concepts regarding natural resources are: recycling, reclamation, extended life (alloys), and reduction of wastes.

KEY TERMS

-- Cyclic Resources - Cyclic relationships involve the exchange of material or energy resources through a series of steps, with the resource eventually returning to the same form as that in which it began, e. g. oil and water.

-- Fossil Fuels - These are called "fossil fuels" because the substances of which they are composed were once living material -- ancient vegetation that accumulated over geologic time. Since they require millions of years to form, they are considered non-renewable. Coal, oil, and natural gas are the three main fossil fuels.

KEY TERMS (continued)

-- Non-cyclic Resources - Non-cyclic relationships involve resources which do not return to their original form. While cyclic relationships are continuous, non-cyclic relationships have a well-defined beginning and end.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- How do vital resources interact? Of what significance to man are the four cycles described in the text?

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-- What do we mean by intelligent management of resources? Through what strategies can man manage resources more intelligently?

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In the TV Documentary:

-- What methods are suggested to minimize resource depletions? What flagrant abuses in resource management are described?

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-- What technological needs are cited in the documentary?

_____

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GUIDING QUESTIONS

Essay (Space provided for notes.)

-- What is a "vital resource"? What relationship exists between a growing population and the natural resources it consumes?

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_____

-- What is a renewable resource?

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-- What is a non-renewable resource?

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_____

-- Identify two cyclic resources. Identify a non-cyclic resource.

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_____

-- What methods are available for minimizing resource depletion?

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-- Why is there a need for long-range planning in the efficient utilization of our vital resources?

_____

_____

Multiple Choice (Key follows Annotated Bibliography.)

1. Methods to minimize resource depletions include all of the following except:

   a. efficient utilization
   b. substitution
   c. omission
   d. reclamation
   e. recycling

2. The television documentary "Conservation of Vital Resources" points out that the built-in obsolescence of American automobiles most directly violates the conservation practice of

   a. recycling resources.
   b. substitution of renewable for a non-renewable resource.
   c. efficiency in resource utilization.
   d. sublimation.
   e. reclamation of waste products.

INVOLVEMENT ACTIVITIES

-- Write to local corporations and inquire whether they are involved in recycling activities.

-- What is your community and/or state doing in order to conserve natural resources? Interview a public official who has primary responsibilities for the management of resources.

-- Review the American historical experience and make a list of several examples of prolonged depletion of natural resources.

-- Look for clues in your community or geographic region that seem to indicate what vital resources are in jeopardy.

-- Find out what is being done with the waste products in your community, campus, or place of employment. What use might be made of such by-products?

ANNOTATED BIBLIOGRAPHY

Johns, Richard H. "Mineral Resources and Human Ecology." No Deposit - No-Return. Edited by Huey D. Johnson. Menlo Park, California: Addison-Wesley Publishing Company, 1970. Pages 151-155.

An informative discussion relating to two central questions: (1) For how long and by what means can we satisfy our demands for non-renewable resources? (2) In the context of such demands, can we learn to live harmoniously within the boundary conditions of our natural system rather than assaulting its constraints in tragic tests of their reality? Written for the layman at a comfortable reading level.

"Why Are We Ruining Our National Parks?" Changing Times. July, 1972. Pages 24-27.

This article explores the present problems concerning the crisis in the national parks as well as where the responsibility may rest. A brief background of the development of the park system is also included.

Stern. Arthur C. Air Pollution. Second Edition. New York: Academic Press, 1968.

These three volumes present an extensive treatment of all aspects of air pollution. The language is sometimes rather technical for the average reader, but as a reference it is invaluable.

Key to multiple choice: (1) C, (2) C

POPULATION DYNAMICS

> The strongest witness is the vast population to which we are a burden and she scarcely can provide for our needs; as our demands grow greater, our complaints against nature's inadequacy are heard by all. The scourges of pestilence, famine, wars and earthquakes have come to be regarded as a blessing to overcrowded nations, since they serve to prune away the luxuriant growth of the human race.
>
> ---Tertullian

OVERVIEW

This module deals with the population explosion which poses a very grave threat to the future of the human species. It explores the interdependent relationships existing among the various organisms occupying any particular habitat. The earth, or any portion thereof, has a definitely limited "carrying capacity," and any increase in population beyond what the support resources can sustain will result in adverse conditions. This is a certain law of nature which cannot be avoided by man.

For tens of thousands of years, the population of the human species remained more or less static under the influence of natural controls. When man gained a degree of dominance over his environment a few thousand years ago, his numbers began to increase. However, it was not until the advent of the Sanitary, Agricultural and Industrial Revolution that the "population explosion" really got underway. As a result of this rapid increase in the number of his species utilizing the earth's resources, man has ushered in the current environmental crisis. Like all other species, man is bound by the constraints of his environment and will ultimately be held accountable for his behavior. As the author of your textbook assignment concludes: "Man's position as the ecological dominant in the environment does not guarantee that the human species will remain on the earth forever."

MAIN IDEAS CONTAINED IN THE UNIT

-- Any given environment has a definite carrying capacity. The population, or number of individuals of a species in any given space, is determined by reproduction minus mortality.

MAIN IDEAS (continued)

-- When population size exceeds the carrying capacity of the environment, natural forces, such as emigration, famine, disease, and lack of shelter, tend to reduce the numbers in the population.

-- Since the resources of Earth are finite, Earth can support only a finite human population. If the number of people exceeds the carrying capacity of Earth, forces will come into play to reduce the population. Rates of population change have an impact on all environmental problems.

-- Stabilization of population growth can allow man to apply more resources toward improving the quality of life.

KEY TERMS

-- Abiotic Factors refer to the physical, non-living influences which affect the organisms of a given population: e.g., temperature, water, sunlight, minerals.

-- Carrying Capacity is the population density of a species that a particular environment can support without damage to the individual organism or to the habitat.

-- Ecological Niche refers to the particular role performed by a species in a given community.

-- Population refers to the individuals of a given species occupying a particular geographic area.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- Note the general ecological concepts discussed.

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THINGS TO LOOK FOR (continued)

-- Review the ways in which "man's modification of the environment" has influenced population growth.

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-- What are the constraints on man's efforts to increase the world's carrying capacity?

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In the TV Documentary:

-- Note the relatively long time span in which man lived as a hunter and gatherer of food. Compare this to the time span in which man has lived in technological, urban societies.

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-- What was the impact of the Industrial Revolution on the rate of increase in the world's population?

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-- Observe the experiments illustrating the interrelatedness of organisms to their environment. How does the fruit fly experiment relate to the concept of "Spaceship Earth"?

GUIDING QUESTIONS

Essay (Space provided for notes.)

-- Explain the Malthusian theory regarding population growth.

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-- Select one of the methods discussed by your author for increasing the world's carrying capacity and explain why you think it probably would or would not be very effective.

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-- What advantages are to be gained from the stabilization of population growth?

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-- What are the possible consequences of continuing the current rate of population growth?

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GUIDING QUESTIONS (continued)

Multiple Choice (Key follows Annotated Bibliography)

1. The upper limit of population density which the resources of any given area can sustain is called that environment's

   a. carrying capacity.
   b. biosphere.
   c. ecological niche.
   d. abiotic factors.
   e. population curve.

2. Prior to the eighteenth century, all of the following natural forces were instrumental in helping to prevent a "population explosion" in the human species, except:

   a. war
   b. famine
   c. disease
   d. pestilence
   e. medical technology

INVOLVEMENT ACTIVITIES

-- Consider the possibility of joining an organization involved in population control. Use Appendix A for suggested organizations.

-- Try to construct possible solutions to some of man's current environmental problems. Observe how each of these problems is in some way related to the population explosion.

-- Talk with someone from the Planned Parenthood or Zero Population Growth organizations to gain a better understanding of some of the problems involved in educating the public to the potential dangers resulting from the current population growth rate.

-- Talk with a member of the clergy or some other well-informed spiritual leader to gain a better understanding of the moral questions arising from various proposals for controlling population.

-- Conduct a survey of business leaders in your community to determine their views on whether they would prefer to have a larger number of customers with smaller incomes or fewer customers with larger incomes.

ANNOTATED BIBLIOGRAPHY

Bennis, Warren G.; Benne, Kenneth D.; and Chin, Robert. The Planning of Change. New York: Holt, Rinehart & Winston, 1969.

An excellent book of planned change strategy. The authors outline various models of planned change but focus most heavily on the power coercive model. Individuals interested in bringing about community change should read this book.

Calhoun, John B. "The Social Aspects of Population Dynamics." Environmental Insight. Edited by Robert M. Chute. New York: Harper and Row, 1971.

An informative article in which the reciprocal problems arising from the impact of social behavior on the growth of populations and the impact of population density on social behavior are discussed.

Key to multiple choice: (1) A, (2) E.

URBANIZATION -- THE LIVING COMMUNITY

The city is the teacher of the man.

--Plutarch

OVERVIEW

The module on Urbanization deals with the quality of human life in the modern city. It briefly discusses the origins of early urban centers and traces their rapid development in Western Europe and North America following the Industrial Revolution. The module explores the cultural advantages of urban living, but is primarily concerned with the major social, economic, and political problems which have resulted from Western man's rapid shift from a predominately rural to a predominately urban civilization. Major emphasis is placed upon the critical need for rational planning which will enable man to cope more successfully with his urban environment.

MAIN IDEAS CONTAINED IN THE UNIT

-- Today's urban centers are plagued by severe environmental problems. Urban sprawl, pollution of water and air, and intolerable traffic conditions are notable examples.

-- Man is a highly adaptable animal, but his basic organic nature evolved in a non-urban environment and is subjected to extraordinary physiological and psychological stresses and strains in the modern urban environment. His potential for survival and adaptation is severely threatened.

-- The city, as an institution, represented a distinct advancement over previous forms of social organizations, and retains certain distinct advantages over other social structures yet today.

-- It is an environmental imperative that man find ways of improving the quality of life in present urban areas, and develop new attitudes and ideas which will enable him to guide more effectively their future growth and development.

-- Urban areas place a great deal of stress on existing resources such as water and air.

-- Urban areas are interdependent with suburban and rural areas.

-- Planned communities are one way to provide for quality environment and reduce high density.

KEY TERMS

-- A master plan is the overall plan for any community, with special emphasis on problems of future growth and development.

-- Megalopolis is a term used to describe a major metropolitan region, linking several urban centers into one continuous string of cities.

-- Urban sprawl refers to the tendency of urban areas to spread out in an ungraceful and unplanned manner in several different directions.

-- Urbanization refers to the process whereby an area, region, or locality undergoes changes which make it take on the characteristics of an urban place.

-- Zoning is a legal device for regulating and controlling urban growth and development -- usually part of a master plan.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- What are some positive qualitites of urbanization?

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_____

_____

-- What are the major social problems in modern urban areas?

_____

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-- What are some possible solutions through individual involvement and urban planning?

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In the TV Documentary:

-- Note the apparent relationship between the lemmings' behavior and greatly increased population density.

--In what ways has the automobile changed the nature of the city?

-- What evidence is suggested regarding "the high psychological cost" of urbanization?

GUIDING QUESTIONS

Essay (Space provided for notes)

-- According to the author of your textbook, in the early cities the wealthiest residents lived near the center of the urban area while the poorer families resided in hovels on the cities' outer rims. What is the socio-economic pattern of residence in the modern industrial city, and how does the author account for the change?

GUIDING QUESTIONS (continued)

-- Of the several major trends in urban planning cited in your text, which one do you consider most workable, and why?

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_____

_____

-- Explain why life in the modern city places severe stress on the organic nature of man.

_____

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Multiple Choice (Key follows Annotated Bibliography)

1. Which one of the following points does the author of your textbook assignment emphasize most as a "positive quality of urbanization? Cities are centers

   a. of intergroup tensions.
   b. of great cultural and intellectual developments.
   c. of fresh water and clean air.
   d. for political experimentation.
   e. of increased personal safety.

2. According to the documentary, one of the most harmful effects of urbanization on the individual has been

   a. a greatly decreased life expectancy.
   b. the loss of ability to earn a livelihood.
   c. the loss of individual identity resulting in what Durkheim described as anomie.
   d. the loss of opportunities for health care.
   e. a decrease in educational opportunities.

INVOLVEMENT ACTIVITIES

-- Visit your city or metropolitan government and find out if there is a master plan for development in your community, with special attention to park sites.

-- Find out who sets zoning policy in your community and talk with them about their procedures. Attend a zoning hearing.

-- Study the transportation problems in your community. Find out what, if anything, is being done to alleviate traffic congestion.

-- Conduct a study to determine to what degree poverty and crime appear to be related in your community.

-- Visit an agency dealing with persons who have mental or emotional problems. Ask whether there seems to be any correlation between their rate of "business" and the decrease or increase of other physical and social problems in the community.

ANNOTATED BIBLIOGRAPHY

Mumford, Lewis. The Urban Prospect. New York: Harcourt-Brace, 1969.

The author continues to challenge contemporary resolutions to problems of the urban setting. The publication is an assemblage of various works, mostly from journals, spaning the last twenty years. A major assertion links the decay of inner city areas with urban dispersal and suburban sprawl. Federal and state funding of regional planning, not solely urban planning is suggested as a method for preserving and perpetuating positive urban qualities.

Citizens' Advisory Committee on Recreation and Natural Beauty. Community Action for Natural Beauty. Washington, D. C. : U. S. Government Printing Office, 1968.

This is a guide for citizens who want to participate in practical action to make their communities better places in which to live; who are particularly interested in ways to provide greater recreation opportunities, and to enhance the appearance of their towns and cities and countrysides. This guide concentrates on the principal approaches, how each works, how they can work together, and what organizations and agencies one can go to for further help.

Key to multiple choice: (1) B, (2) C.

AIR POLLUTION

. . . This most excellent canopy, the air,
look you brave overhanging firmament,
this majestical roof fretted with golden
fire, why it appears no other thing to
me but a foul and pestilent congregation
of vapours. . .

---William Shakespeare

OVERVIEW

The purpose of this module is to examine the sources of air pollutants, what the pollutants are and their effect on human health, structural materials and agriculture. In order to make decisions about possible ways of dealing with the dangerous wastes in our air, citizens need to be well informed and able to intelligently examine projected "solutions," as well as possible consequences of these solutions.

MAIN IDEAS CONTAINED IN THE UNIT

-- The earth with its atmosphere is virtually a closed material system in which large quantities of pollutants are trapped.

-- Climate, weather, and topography affect air quality by influencing the dispersal and inter-reactions of pollutants.

-- Air pollution induces unhealthy changes in living tissue, both plant and animal.

-- The dollar costs of air pollution are evident in such things as agricultural losses, damage to building and structural materials, lost man-hours, and increased medical expenses, all of which may result in increased taxes.

-- The maintenance of air quality must be on an airshed or geographical basis rather than on the bases of established political boundaries.

KEY TERMS

-- Airshed - An airshed is any given reservoir of air masses; an air "drainage" or collection area. This term is used to describe reservoirs or systems of air in the same way that the term watershed is used to describe water drainage or collection areas. Topography as well as prevailing winds and convection currents, etc., tend to delimit an airshed.

-- Closed System - Technically, a closed system is a system in which there is no inflow or outflow of energy or matter. We usually refer to a system as being closed to specific substances. For all practical purposes, we can refer to the Earth as a closed system, closed to matter. We receive negligible amounts of material (in science, matter is anything that occupies space, such as a chair or an air molecule) from outer space in the form of meteorites, etc. In return minute quantities of matter escape the earth's gravity into outer space. However, the only significant input, ar[illegible]e could not survive without it, is energy from the sun. The "closed system" concept is a useful way to conceptualize Earth --- it is similar to the Spaceship Earth concept, in that it emphasizes the fixed resources of earth and the need to exercise stewardship over them.

-- Convection - Convection means to transmit or convey. Here, we are concerned with the movement of molecules of air and masses of air. Warm air is not as dense as cool air, therefore, it rises and may carry heat or matter with it. Air convection currents tend to disperse air pollution because the usual convection currents are upward or away from the Earth's surface.

-- Photochemical Smog - The term smog was coined to describe a mixture of smoke and fog. "Photochemical" means a chemical reaction that is facilitated by light. In the case of photochemical smog, it has been found that various pollutants react with each other to form substances that were not initially present. These chemical reactions take place faster in the presence of sunlight.

-- Pollutant - A pollutant is anything that impairs some resource for any defined purpose. Natural systems can tolerate small amounts of certain pollutants, but in excess of those amounts the system begins to change or break down. Air pollutants are such things as sulphur dioxide(SO_2), nitrogen oxides(NO_2), carbon monoxide(CO), et cetera.

-- Thermal Inversion - The warmest air is usually found next to the surface of the Earth. However, sometimes a layer of warm air will trap a layer of cooler air beneath it. When this "inverted" condition occurs, the layer of warm air acts like a lid on a jar and pollutants collect in the layer of cooler air beneath it. Though there is some mixing, most pollutants (particularly the heavier ones) do not pass through the warm air layer.

-- Topography - This is the study and description of the surface characteristics of the earth. It covers such things as lakes, mountains, and oceans. The topography of an area has effect on the wind and convection currents of an area, as well as temperature. It therefore has an effect on the concentration of pollutants. Note the description of the Los Angeles basin in both the text and television documentary.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- Pay particular attention to the effect of climate, weather, and topography on the dispersal of air pollutants.

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-- Note the harmful effects of air pollutants on human health.

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-- Become aware of the most common air pollutants and their sources.

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-- Observe the need for regional (or airshed) enforcement of air quality standards.

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THINGS TO LOOK FOR (continued)

-- Become aware of the most common air pollutants and their sources.

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-- Observe the need for regional (or airshed) enforcement of air quality standards, rather than simply local enforcement.

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In the TV Documentary:

-- Note that man has no biological mechanism to store oxygen.

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-- What particular groups of people are most susceptible to the effects of air pollution?

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-- What is the central message of the Fenwick Hack cartoon? It seems that everyone is passing the buck - where does it stop?

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GUIDING QUESTIONS

Essay (Space provided for notes.)

-- Describe a closed system. Can you give an example?

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-- Both air and water are "common pool" resources -- i.e., we all use them from a common pool or common source. How does air differ from water in man's ability to "selectively consume" it?

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-- The air pollution problem in Los Angeles has been widely publicized. What conditions are present in the Los Angeles area that contribute to the problem?

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-- What might be the dangers (from air pollution) in locating schools or housing very close to expressways?

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-- Which socio-economic segments of our society are most affected by air pollution?

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GUIDING QUESTIONS (continued)

-- How can air pollution increase your taxes?

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-- Why is it necessary to enforce air quality standards on a regional (or airshed) basis?

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Multiple Choice (Key follows Annotated Bibliography)

1. A warm blanket of air that prevents the natural rise of air currents creates a phenomenon known as

   a. cilia action.
   b. carbon monoxide.
   c. atmospheric congestion.
   d. thermal inversion.
   e. barometric pressure.

2. Annually in the United States air pollution costs each man, woman and child about

   a. $ 10
   b. $ 32
   c. $ 50
   d. $ 65
   e. $150

INVOLVEMENT ACTIVITIES

-- Check with your local governmental officials to find out what agencies and laws exist to deal with problems of air pollution.

-- Write to your city, county, state, and national legislators and let them know that you strongly support regulations on industries causing air pollution. Explain why.

-- Contact your local officials to see what plans are in effect or being considered for the development or improvement of a mass transit system in order to reduce pollution resulting from the internal combustion engine.

-- Determine the major source of air pollution in your community and find out how individuals and groups are combating them.

ANNOTATED BIBLIOGRAPHY

Dubos, Rene. So Human An Animal. New York: Charles Scribner's Sons, 1968.

A slightly more philosophical but equally penetrating discussion of man and his environment -- undoubtedly one of the best treatments of the subject.

Nader, Ralph. Vanishing Air. New York: Grossman Publishers, 1970.

This book does a particularly good job of discussing present air maintenance legislation and it's strengths and weaknesses. It is a good source of information on personal involvement strategies. Of particular interest is the section dealing with strategies and propaganda used by special interest groups that may attempt to postpone, block or subvert air quality standards. It's easy, interesting reading for the layman.

Pauline, Lawrence J. and Weishaus, Howard. "Air Pollution." Ecology: Man's Relationship to His Environment. New York: Oxford Book Company, 1971.

An informative, easily-read discussion of air pollution that includes two case studies: (1) the family automobile and (2) air pollution in New York State. Radioactive fallout is also discussed as an air pollutant.

Key to multiple choice: (1) D, (2) D.

SCENIC POLLUTION

I think that I shall never see,
A billboard lovely as a tree,
Indeed unless the billboards fall,
I'll never see a tree at all.

-- Ogden Nash
Song of the Open Road*

OVERVIEW

Scenic pollution is primarily visual degredation of our surroundings. It is a frequent by-product, and often primary indicator of, unhealthy environmental practices. This module seeks to point up some major types of scenic pollution and its causes, to explore the background of some of our environmental perceptions, and to suggest ways in which we can alter landscapes with healthier, more esthetically pleasing results.

MAIN IDEAS CONTAINED IN THE UNIT

-- Man's perception of himself and of his relations to nature determines the manner in which he treats his surroundings.

-- Scenic pollution is an indicator of an unhealthy ecological condition.

-- Realistic, environmentally sound scenic modification must create an attractive environment which can support the livelihood of its inhabitants with minimum disruption of the ecosystem.

-- Industrial manufacturing procedures, including cost accounting systems, must be changed to include the processes and costs necessary to avoid environmental destruction.

KEY TERMS

-- Biodegradable - This term refers to any substance capable of being readily decomposed by biological action, especially by bacterial action.

*Reprinted with permission from Verses From 1929 On by Ogden Nash. Boston: Little, Brown and Company. Copyright 1932 by Ogden Nash.

KEY TERMS (continued)

-- Caving In (Subsidence) - This term is used to refer to the occurrence of massive collapses of surface areas into mining shafts which are inadequately supported.

-- Composting - A procedure used to return organic waste materials to the soil as fertilizers is referred to as composting.

-- Recycling - Reprocessing of waste products and materials for reuse is called recycling.

-- Sanitary Landfill - A solid waste disposal process in which solid waste products are evenly distributed over an area and at least daily covered with soil is called a sanitary landfill.

-- Strip Mining - The process, strip mining, is used to extract veins of ore close to the surface by scrapping away surface soil. It leaves gouges on the surface.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- Scenic pollution occurs most often on a large scale from mining practices, oil spills, solid waste disposal sites and, overwhelmingly in the urban environment.

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-- Be sure to note in what ways these sites of scenic pollution are indicators of unhealthy ecological conditions.

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-- How do man's attitudes toward the environment reflect his perceptions of his relationship to nature?

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THINGS TO LOOK FOR (continued)

-- What changes in lifestyle, including the home, industry, and government, need to be made to achieve attractive scenic alterations that are realistic in terms of physical and economic necessities?

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In the TV Documentary:

-- Since scenic pollution is visual contamination and since beauty, or lack of it, is a highly subjective determination, the TV Documentary for this module places great emphasis on the relationship between what we see and how we feel. You should pay particular attention to your emotional and attitudinal reactions to the visual content. Also, listen carefully to the following sequences which supplement the textbook chapter.

-- The American Indian: His perception of his surroundings and his treatment of the natural environment.

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-- The Frontier Mentality: North America is blessed with such an abundance of resources that we need not worry. When our supply here is exhausted, we just have to move west.

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-- The Urban Environment: Maximum scenic and sensory pollution. What emotional reactions do you experience as you walk through the streets with a young lady? Are these what you actually feel on a crowded city street?

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THINGS TO LOOK FOR (continued)

-- A Technological Solution to the Problem of Waste Disposal: Note that technology, often portrayed as the environmental villain, can often be its savior. Such use of the technology is often not counter to one of man's current attitudes; it can be economically profitable.

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GUIDING QUESTIONS

1. Make a chart comparing the perceptions of the American Indian and the European settler in North America, of their places in nature and their treatment of the environment. Remember, they existed concomitantly in the same environment, but had different cultural backgrounds.

2. Add to this chart industrialized man. How does he perceive himself in nature? How has he handled nature?

	American Indian	Early Settler	Industrial Man
Man's Place in Nature ----			
Treatment of Environment ----			

3. Thoughtful land-use planning can be in harmony with nature. What does this involve? How can it be accomplished?

4. How can the profit motive be used to promote sound scenic modifications?

GUIDING QUESTIONS (continued)

-- Landscape architect Ian McHarg is a strong supporter of planning with nature. What does this involve?

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- How can the profit motive be used to promote sound scenic modifications?

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-- Changes in industrial manufacturing procedures must be made to prevent environmental destruction. What changes are necessary? How will man's attitudes have to change? What way will this affect his perception of his place in nature?

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Multiple Choice (Key follows Annotated Bibliography.)

1. The early European settler in North America tended to view the land as

   a. an adversary to be tamed.
   b. a source of esthetic inspiration.
   c. a sacred substance to be protected.
   d. a thing to be used wisely and preserved for future generations.
   e. an integral part of God's creation.

2. According to your text, the ideal landscape is one

   a. which supports the livelihood of its inhabitants.
   b. of beauty and charm.
   c. which provides an opportunity for luxurious living.
   d. of beauty and charm which also supports the livelihood of its inhabitants.
   e. which possesses majestic mountains and beautiful valleys.

INVOLVEMENT ACTIVITIES

-- Some of the most obvious causes of scenic pollution are mining activity, oil spills, solid waste, highway projects, and strip commercial development. Note some examples of scenic pollution in your community.

-- A great many of man's activities significantly alter the landscape. With foresight and care, these alterations can be carried out in a manner that will bring about minimal disruption of the ecosystem. Select one possible project in your community and design and plan a course of action for implementation that would modify the landscape.

-- What kind of organization or agency would you recommend to be established in your community to provide and facilitate scenic modification? What would its role, scope and mission be?

-- Survey local business enterprises relative to how they view scenic pollution. Contrast their views with those of other citizens in the community. Try using business arguments to facilitate abating scenic pollution.

ANNOTATED BIBLIOGRAPHY

Commoner, Barry. Science and Survival. New York: The Viking Press, 1966.

Presents and discusses the dangers of scientific innovation whose effects on man and the environment are not always known. Excellent.

Eliassen, Rolf. "Solid Waste Management". No Deposit-No Return: Man and His Environment, A View Toward Survival. Pages 55-65. (An anthology of papers presented at the 13th National Conference of the U. S. National Commission for UNESCO.) Edited by Huey D. Johnson. Menlo Park, California: Addison-Wesley Publishing Company, 1970.

A non-technological discussion of all aspects of solid waste management. The discussion includes the political and economic aspects of solid waste disposal systems, sources of solid waste materials and suggested procedures in solid waste disposal systems. A good primer for the neophyte activist.

McHarg, Ian. Design With Nature. Garden City, New York: Natural History Press, 1969.

An architect looks at the treatment of the natural surroundings by his profession. The author suggests that ecological data and the form of the landscape be given serious consideration in the design of buildings and structures.

ANNOTATED BIBLIOGRAPHY (continued)

Montague, Ashley. "Wilderness and Humanity. Wilderness in a Changing World. San Francisco: The Sierra Club, 1968.

A college-level reading on the psychological and humanistic effects of the disappearance of large areas of wilderness. The author feels that the rise of the urban environment and the subsequent disappearance of large areas of wilderness separate man from the ability to feel and perceive as a human being and impairs his awareness of man's unity with nature.

Key to multiple choice: (1) A, (2) D.

WATER -- SUPPLY, DEMAND AND POLLUTION

Water, water, everywhere,
And all the boards did shrink;
Water, water, everywhere,
Nor any drop to drink.

--Samuel Taylor Coleridge

OVERVIEW

This module deals with that resource which is essential to all life - water. Although it is distributed across the earth's surface in seemingly large quantities, only a small amount of water is actually available to man. In view of this limitation, the module explores the causes of water shortages, particularly those for which man himself is responsible. Since man's activities are a major factor in causing water shortages, it is also necessary to discuss ways in which man may limit his own interference in the earth's limited supply of fresh water. Pollution control is stressed as a means for preventing a further deterioration of the earth's water supply.

MAIN IDEAS CONTAINED IN THE UNIT

-- Water exists on Earth in a fixed amount, only a small fraction of which is fresh water available to man. It is cycled through Earth's ecosystem in various forms and is distributed unevenly across Earth's surface.

-- Man's uses and abuses of water disrupt the natural functioning of the water cycle and can limit locally the quantity and quality of water available to living things.

-- Water pollution, which is defined as the impairment of water for defined purposes, occurs naturally, but has been so increased by man as to inhibit natural cleansing action.

-- Intelligent water management includes reduction in water use, maintenance and preservation of water recharge areas, pollution control, and water recycling.

-- The utilization of available water control technology has been largely inhibited by competitive jurisdictions over water bodies and the cost of such processes.

-- The two great consumers of water are agriculture and industry.

KEY TERMS

-- Aquifer - This term refers to the underground water-bearing rock strata which contains most of Earth's liquid fresh water. These underground water sources feed rivers, ponds, lakes, and streams. Man "mines" water from aquifers with wells.

-- Eutrophication - This term describes the "aging" of a body of water. Water bodies age prematurely when nutrients accumulate and support a dense growth of plant and animal life. The decay of this growth depletes the water of oxygen.

-- Bio-chemical Oxygen Demand (BOD) is the amount of oxygen required to stabilize the demands from aerobic biochemical action in the decomposition of organic matter.

-- Nutrients - These are substances that promote the growth and development of living organisms. Inorganic nitrates and phosphates are the nutrients which most often lead to eutrophication. Laundry detergents, fertilizers, and sewage are some of the sources of excessive nutrients in water bodies.

-- Sewage Treatment is described in three levels: primary, secondary, and tertiary.

a) Primary: This process removes sediment and solid inorganic materials from waste water. (A settling process)

b) Secondary: This process should remove solid organic wastes by using bacteria that breaksdown human wastes. The liquid effluents are very rich in nutrient materials. (Biological action)

c) Tertiary: This process is any treatment beyond secondary treatment. It typically refers to the removal of nutrient materials from sewage effluents, but may also refer to the removal of inorganic substances or treatment to destroy viruses. (Follows primary and secondary treatment - such as activated carbon)

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- Note the author's treatment of the maintenance of water recharge areas. What is a recharge area?

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THINGS TO LOOK FOR (continued)

In the TV Documentary:

-- Note the ways in which man's activities contribute to water pollution.

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-- Is the problem of water pollution universal?

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-- Observe the processes of sewage treatment and ocean dumping in coastal areas.

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GUIDING QUESTIONS

Essay (Space provided for notes.)

-- Man can generally use only a small portion of Earth's water supply. Drought, increased consumption, and pollution even further limit this supply. Why is pollution considered a limitation on water supplies when it does not actually remove water from Earth's surface?

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-- Man's uses for water can generally be categorized as per capita consumption, food production and industrial use. How do each of these uses turn into abuses?

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GUIDING QUESTIONS (continued)

-- Define water pollution. According to this definition, should we strive in pollution control for drinking water quality? Why or why not? Give some examples to illustrate your response.

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-- In your region, what problems do you note in maintaining water recharge areas?

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-- Water, as well as air, is a "common pool" resource. What does the "common pool" characteristic apply to pollution? How does this "common pool" designation relate to the problem of competing jurisdictions?

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Multiple Choice (Key follows Annotated Bibliography)

1. "Any impairment of quality that is injurious to the suitability of water for defined uses" is a workable definition of

   a. hydrologic cycle.
   b. mining water.
   c. salt water intrusion.
   d. irrigation usage.
   e. water pollution.

2. An overabundance of algae and absence of dissolved oxygen to sustain aquatic animal life results in a condition known as

   a. phosphate replacement.
   b. eutrophication.
   c. sewage treatment.
   d. chemical roulette.
   e. effluent water.

INVOLVEMENT ACTIVITIES

-- Pay a visit to a beach, river or lake near some industrial center and make a list of evidence of pollution in the area. Send the list to your state, local, and federal representatives and ask them to sponsor legislation designed to bring about improvement in the situation.

-- Investigate the sewage treatment facilities for your community. If you feel the situation warrants corrective measures, organize your neighborhood to press for improved sewage treatment facilities.

-- Request a copy of the booklet "Clean Water" from the Izaak Walton League. It is an invaluable resource on citizen action opportunities to improve water quality.

ANNOTATED BIBLIOGRAPHY

Aylesworth, Thomas G. This Vital Air; This Vital Water: Man's Environment Crisis. Chicago: Rand McNally, 1968.

A good basic discussion of the problem of air pollution and water shortages and pollution.

Dubos, Rene. Man Adapting. New Haven: Yale University Press, 1969.

A thorough treatment of man and his environment with particular emphasis on health, disease and medicine. A classic.

Johnson, Huey D., ed. No Deposit-No Return. Menlo Park, Calif.: Addison-Wesley Publishing Company, 1970.

Listed below are three readings related to water pollution.

Moore, Joseph G., "Water."
This paper discusses the chaos of our present water management, examines the reasons and proposes ways to improve the situation. Pages 112-114.

Pryor, Taylor A., "The Sea."
The author discusses the need for massive teamwork between science business and political interests to save the oceans. Pages 115-121.

Riseborough, Robert W. "The Sea: Should We Now Write It Off as A Future Garbage Pit?"
This reading presents ample evidence that the oceans are dying. The author discusses the sea's productivity, their pollution and our vital dependence on living and healthy seas. Pages 121-136.

Pauline, Lawrence J. and Weishaus, Howard. "Water Pollution." Ecology: Man's Relationship to His Environment. New York: Oxford Book Company, 1971.
A very basic discussion of the problems of water pollution with 2 case studies. Advanced high school or lower division college level.

Key: (1) E, (2) B

FOOD AND DRUG POLLUTION

The proof of the pudding
is in the eating.

-- Henry Glapthorne

OVERVIEW

This module focuses on the commodities of those industries which produce the goods on which most Americans spend the largest proportion of their money --food and drugs. The module first investigates the indiscriminate use of chemicals in the production and processing of foods which results from an overemphasis on economic considerations. Secondly, it focuses on the overuse and misuse of drugs -- both the "dangerous" types and the medicine chest variety. Finally, the module deals with the governmental regulation of the food and drug industries, the need for stronger control, and the complications involved in achieving tighter regulation.

MAIN IDEAS CONTAINED IN THE UNIT

-- The addition of chemicals to food during processing may be justifiable for reasons of public health and economic considerations. Disproportionate emphasis on economic factors, however, has resulted in the indiscriminate use of food additives.

-- The use of agricultural chemicals is necessary to produce food sufficient to meet the population's need. Indiscriminate use of pesticides, hormones and antibiotics, however, has resulted in the presence of potentially dangerous foreign substances in food.

-- Misuse and overuse of drugs is encouraged by limited and frequently misleading information about medicines and by inadequate regulatory procedures.

-- Solutions to the problems of food pollution and drug misuse are complicated by the far-reaching political power of the food and drug industries and the lack of government controls adequate to insure consumer food and drug safety.

KEY TERMS

-- Convenience Food - The advent of the now-common convenience food has been a major factor in the increased use of food additives. These foods range from instant coffee to entire frozen meals and require very minimum kitchen preparation. The complex new techniques needed to produce convenience foods necessitate wide use of food additives.

-- Drug Pollution - This term can refer to almost any dangerous effect of drug use. For purposes in this module, drug pollution is: (1) the contamination of the human body with dangerous drugs or with too many drugs; (2) the availability of many non-prescription drugs which are well-advertised and which are not necessarily harmless, even when taken as directed; and (3) the contamination of the human spirit which results from the use of drugs to avoid the normal ups, downs, and discomforts of living.

-- Food Additives - Food additives are chemical substances added during processing procedures. Additives are used to (1) enhance taste; (2) enhance appearance; (3) prolong shelf life; (4) facilitate processing; and (5) replace nutrients lost during processing. Food additives can become contaminants of food through indiscriminate use.

-- Food Pollution - Food pollution refers to the indiscriminate use of chemical substances in food which are used during agricultural production and industrial processing.

-- Food and Drug Administration (FDA) - The FDA, a unit of the U.S. Department of Health, Education and Welfare, is the federal agency charged with primary responsibility for policing the fitness of food, drugs, cosmetics, and medical equipment. Unfortunately, the Agency does not possess adequate power. It also shares responsibility for food and drugs with other federal, state, and municipal agencies. As of this writing, a bill is before Congress that would abolish this agency and create a new and stronger one in its place.

-- Pesticides - Pesticides such as agricultural chemicals are used to increase agricultural efficiency by eliminating unwanted pests, insects, plants and small animals. These chemicals, like food additives, have legitimate uses. They become pollutants when used indiscriminately.

-- Proprietary Drugs - These drugs are more commonly referred to as "patent medicines." They are widely advertised and can be purchased without a physician's prescription. They can be harmful to the consumer.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

This module discusses two different categories of pollution. Be sure that you understand that neither food pollution nor drug pollution actually refers to "dirty" food or drugs in the bacterial sense of the word.

-- Specifically, food additives are used to (1) enhance taste; (2) enhance appearance; (3) prolong shelf life; (4) facilitate processing; and (5) replace nutrients lost in processing. Your text states these purposes in terms of economic considerations. Relate the purposes of food additives to economic considerations. Which purposes are of economic importance to you?

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-- Pesticides are necessary if man is to produce food in sufficient quantity to meet his needs. Do you understand, however, the dangers of pesticides, their effects on man, and how they can become pollutants?

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-- Be sure that you recognize the major problems with the regulation and control of the food and drug industries. What are the responsibilities of the FDA?

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In the TV Documentary:

-- Pay particular attention to the hormones used in livestock production. This is not mentioned in your text; be sure to take some notes. How do hormones work in the human body? What might happen if that balance is upset?

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THINGS TO LOOK FOR (continued)

-- As you note the various additives contained in food, how many appear to be necessary? How many are only there for appearance? Which would you be willing to forego? Will you eat an orange that is not orange color? A hot dog that is gray? Milk that is yellow instead of white?

-- What part does the United States Department of Agriculture play in the regulation and control of the food and drug industries?

GUIDING QUESTIONS

Essay (Space provided for notes.)

-- For what purposes are food additives used?

-- In what way do agricultural chemicals become pollutants?

-- What are the four major groups of pesticides? What are the dangers of each?

GUIDING QUESTIONS (continued)

-- Why are vitamins, aspirin, and other proprietary drugs considered in a study of drug pollution?

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-- The enormous political influence of the food and drug industries is largely based on their financial position. From whom do these industries get their power? How can the consumer use his food and drug dollar to vote for honest advertising, safe food and drugs?

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Multiple Choice (Key follows Annotated Bibliography.)

1. Food additives are frequently used for each of the following purposes, except:

   a. to speed the process by which the food product becomes usable or marketable.
   b. to enhance the food product's appearance or otherwise make it more salable.
   c. to prevent anything from going wrong that might make it less marketable.
   d. to prevent spoilage, discoloration, shrinkage, et cetera.
   e. to build up the nutritional value of the product.

2. According to your text, is is advisable to

   a. use depressants but avoid stimulants.
   b. use stimulants but avoid depressants.
   c. use only proprietary drugs.
   d. use no drugs whatsoever even when recommended by a physician.
   e. adopt a highly questioning attitude toward all drugs.

INVOLVEMENT ACTIVITIES

-- Remember that the consumer does have power. Organize a group in your community to write letters to the United States Food and Drug Administration expressing specific concerns.

-- If your local college does not already have a course in consumer education, ask them to develop one concentrating on problems related to food and drug pollution. If your college does have such a program, obtain a syllabus and review the material.

-- Visit your local or regional FDA office and discuss with that agency whatever problems they feel are presently most pressing. Make a list of these problems and share them with your local and state representatives.

ANNOTATED BIBLIOGRAPHY

Carson, Rachel. Silent Spring. Boston: Houghton-Mifflin, Co., 1962. (Also available in paperback from Fawcett Publications.)

The classical warning of the dangers of chemical pesticides. Easily understandable for the layman.

Gerwitz, Henry and Graham, Saxon. "Pharmaceuticals: Valley of Lies." Transaction. February, 1970.

This article discusses those problems relating to the use and abuse of pharmaceutical drugs as they relate to the drug industry and the medical professions. It focuses attention specifically on those issues relating to the costs of drugs, the effects of drugs and the need for better research on the drugs we consume. It is a very interesting, easily read article.

Hunter, Beatrice Trum. Gardening Without Poisons. Boston: Houghton-Mifflin, Co., 1964.

An overall introduction to organic gardening and to gardening without the use of dangerous pesticides. Again, a good layman's book and very helpful to those particularly interested in growing chemical-free food.

BIBLIOGRAPHY (continued)

Jacobs, Jane. The Death and Life of Great American Cities. New York: Random House, 1961.

A controversial book based on the personal experience and observation of a resident of Greenwich Village in New York which argues against many traditional urban planning practices that are insensitive to the social dimensions of our urban environment.

Turner, James S. The Chemical Feast. New York: Grossman Publishers, 1970

This book is a report on the Food and Drug Administration, and castigates the FDA for its permissive attitude about food additives. It discusses a number of issues in the testing and marketing of food additives that are of concern to consumers. It is written for the layman.

Key to multiple choice: (1) E, (2) E.

SOUND POLLUTION

Far off noises of the world retreat;
The loud vociferations of the street
Become an undistinguishable roar.

--Henry Wadsworth Longfellow

OVERVIEW

The purpose of this module is to explore the ways that noise poses both a physical and psychological threat to the well-being of man. Noise has only recently been recognized as a serious pollutant of our environment. Because man tends to mentally screen out noise, it can "sneak up" on him and cause damage even though he is not aware of the sound. Sound has certain physical characteristics such as loudness or pitch. In order to make sensible decisions related to sound exposure or noise abatement legislation, we should examine the effects of sound on the human body, the characteristics of sound that make it a dangerous environmental pollutant, noise levels existing in our every day environment as well as strategies for noise abatement.

MAIN IDEAS CONTAINED IN THE UNIT

-- Sound is a pollutant of the environment that can damage the ear as well as the physical and psychological health of man. Such damage may be permanent.

-- Sound damage is dependent on intensity, pitch, and duration.

-- Even though man has the ability to mentally screen out noise, damaging effects continue even when he is not consciously aware of the sound.

-- Sound levels in many human environments already exceed the limits considered safe to human health.

-- It is possible to control sound pollution through engineering, economics and political action when citizens demand it.

KEY TERMS

-- Acclimation - This is a form of adjustment or "getting used to" a particular set of stimuli. It happens with many of our receptor sensations. In regard to sound, it means that we "adjust" to a certain sound so that it is no longer painful or distracting. It is one of our protective mechanisms, in a sense. Sometimes, however, these mechanisms work against us -- we "adjust" to something that is harmful. For even though we may acclimate to a sound, it can continue to inflict damage on the ears or induce other forms of stress if the sound is of sufficient intensity.

-- Audible Range - These are the sounds to which the human ear is sensitive. Not all sounds can be heard by man. There is a lower limit below which man cannot hear for both intensity (amplitude) and pitch (frequency). The text defines these limits. You need not memorize them. In addition, there is an upper limit with regard to pitch. Very high pitched sounds pass out of man's audible hearing range.

-- Decibel - This is a unit of measurement for the intensity of a sound, just as a Fahrenheit degree is a unit of measurement for the intensity of heat.

-- Hair Cells - These are the microscopic structures in the inner ear that are closely associated with the sensory nerve receptors transmitting nerve impulses to the brain. These structures can be damaged by certain types or levels of sound with a resulting hearing loss.

-- Intensity (or amplitude) - Intensity is the loudness of a sound. When describing a sound wave, the amplitude or height of the wave is a measure of the loudness of the sound. Silence has zero amplitude or zero intensity.

-- Pitch (or frequency) - Pitch describes the highness or lowness of a sound. When describing a sound wave, frequency is a measure of the number of oscillations or peaks within a given time interval. The higher the pitch, the greater the frequency.

-- Threshold Level - That point at which we begin to perceive or begin to become aware of a stimulus is referred to as the threshold level. Most sensory functions such as our perception of pain, color, temperature, taste, and sound have a threshold level.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- What are the physical effects of sound on the body, in addition to its effect on the ears?

_____

_____

THINGS TO LOOK FOR (continued)

-- What are the psychological effects of stress and tension induced by noise?

_____

_____

_____

-- Note the anatomy and physiology of the human ear.

_____

_____

_____

In the TV Documentary:

-- Observe the characteristics of sound -- pitch, intensity, and duration.

_____

_____

_____

-- What is the decibel scale?

_____

_____

_____

-- Why is there a need for citizen strategies, noise abatement legislation and enforcement, and grassroots pressure?

_____

_____

_____

-- Note the danger points in the sound intensity.

_____

_____

_____

GUIDING QUESTIONS

Essay (Space provided for notes.)

-- Sound can induce mental stress and tension in man. What is the relationship between tension or mental stress on the other physical "symptoms" described in the text and documentary? For what group of people might a noisy environment be particularly detrimental?

_____

_____

_____

-- In the "Air" study questions, reference was made to "common pool resources". Is sound a pollutant of a "common pool" resource? Explain.

_____

_____

_____

-- How does duration interact with intensity in causing hearing damage?

_____

_____

_____

-- While attending a July 4th fireworks display, you notice that the noise causes you intense pain at first, but later you can tolerate the sound. What process has taken place? What happened to your pain threshold level? After the display is over, will there be any long term or short term difference in your hearing?

_____

_____

_____

-- Name several of the noisiest human environments. What can be done to correct these situations?

_____

_____

GUIDING QUESTIONS (continued)

-- Name several ways that sound pollution infringes on your rights (rights to privacy, freedom of choice within defined limits.)

_____

_____

_____

Multiple Choice (Key follows Annotated Bibliography)

1. The ear is a sensitive device which if not properly taken care of an be destroyed. The part of the ear which is most sensitive of all if it is injured in any was is the

   a. external ear
   b. middle ear
   c. inner ear
   d. pinna
   e. typanic cavity.

2. In the United States the "background" noise level

   a. is declining.
   b. has remained fairly constant over the years.
   c. has doubled over the last ten years.
   d. has had no proven harmful effects on humans.
   e. is the proven cause of fertility loss in some humans.

INVOLVEMENT ACTIVITIES

-- Write the National Association of Hearing and Speech Agencies, 919 18th Street, N.W., Washington, D.C. 20006. Members of this association are interested in prevention of deafness and the conservation of hearing.

-- What is a citizens suit? Do you know of any such suits pending in your area relative to noise abatement? Interview a local attorney or judge and discuss the legal implications of sound pollution.

-- Make a list of sound pollutants in your community.

-- What recommendations would you make to minimize the noise level in your home? The decibel level may indeed be higher than you think!

ANNOTATED BIBLIOGRAPHY

Bernarde, Melvin A. "Noise." Our Precarious Habitat. New York: W.W. Norton Company, 1970. Pages 220-243.

A very good overall discussion of noise, how it affects the human ear, other effects on man, the characteristics of sound as they relate to noise pollution. He also discusses past, present and desirable future actions to decrease the level of noise in our environment. Mr. Bernarde provides an extremely clear, although somewhat technical discussion of the logarithmic nature of the decibel scale. The reading contains some excellent diagrams and graphs. The book is at an advanced lower division college level.

Harris, Cyril M. Handbook of Noise Control. New York: McGraw-Hill, 1957.

Good source of invormation on how noise can be controlled.

Pauline, Lawrence J. and Weishaus, Howard. "Noise Pollution." Ecology: Man's Relationship to His Environment. New York: Oxford Book Company, 1971. Pages 161-170.

A good book for the layman on the problem of noise pollution. The author discusses all aspects of noise and noise pollution and gives a detailed discussion on federal and state noise abatement regulations. Sound problems related to the supersonic transport (SST) is provided as a case study. The chapter is written at a comfortable reading level - advanced high school or lower division college level.

Key to multiple choice: (1) C, (2) C.

INDIVIDUAL INVOLVEMENT

You do not educate a man by telling
him what he knew not, but by making
him what he was not.

-- John Ruskin

OVERVIEW

This week's module focuses on one of the major objectives of the Man and Environment course: personal commitment. In order that the environmental problems on the local, regional, or national level be solved, each individual must commit himself to do his part. To find solutions to these problems, one has possibly several courses of action open to him: confrontation, awareness education, due process of law, boycott, ballot box, lobbying, and research. Whatever course is taken, the improvement of the quality of the environment is dependent on each of us. Let us not forget that!

MAIN IDEAS CONTAINED IN THE UNIT

-- Individual involvement is an essential component of environmental action.

-- Environmental action can be accomplished by the individual, alone or in a group, in the home or at the local, regional, and national levels.

-- An involved individual can select from a wide variety of activities. He should select those which are best suited to his talents and interests.

-- Effective involvement can best be achieved by concentrating action on one particular cause at a time.

-- Individual involvement in environmental action can be effective only when the problem selected is usually within the capability of the individual or particular group to resolve.

-- Effective action on behalf of the environment must be based on sound knowledge of both the problem and the possible solution.

-- By application of a design using the scientific method, an individual or group has a guide for objectivity and for logically developing a plan of action.

KEY TERMS

-- Custom - Perhaps the greatest source of resistance to be encountered in individual involvement will be from people who have been doing something so long that it seems right. This is what is meant by custom.

-- Federal Policies - Federal agencies (e.g., Department of Agriculture, National Park Service, Office of Education) are the vehicles by which federal policies are implemented. Federal policies are written by various committees of the Congress or prepared by the executive branch of government.

-- Regional Involvement - The joint efforts of the several states in the Great Lakes region to eradicate the lamprey eel may be cited as one example of regional development and involvement.

-- Research - The systematic search for truth based on data collected in an objective fashion is called research.

-- Scientific Method - The scientific method is a systematic inquiry in research which involves establishment of a hypothesis, collection of data, analysis and interpretation of data, and arriving at tentative conclusions from the data.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- Note the professional groups and federal agencies involved in pollution control.

_____

_____

_____

--What are the courses of action open to those persons interested in environmental involvement?

_____

_____

_____

In the TV Documentary:

-- How can you make an individual aware of environmental problems?

_____

_____

_____

-- What can an individual do to combat environmental problems? (For example, an individual may call up the Pollution Control Office, County Attorney's Office, or City Commission, or simply clean his own backyard.)

_____

_____

_____

-- What are some of the environmental problems discussed in the documentary?

_____

_____

_____

GUIDING QUESTIONS

Essay (Space provided for notes.)

-- As a prospective participant in individual or group involvement programs, what possible courses of action would be open to you?

_____

_____

_____

-- Environmental stress and problems may be the result of many contributing factors. Briefly summarize and discuss these factors.

_____

_____

_____

-- What is the scientific method? Illustrate the application of this method by relating it to a specific environmental problem.

_____

_____

_____

Multiple Choice (Key Follows Annotated Bibliography)

1. Which of the following professional organizations is <u>not</u> actively involved in influencing legislation and bringing forth environmental issues of which the citizenry may not be aware?

   a. National Audubon Society
   b. Izaak Walton League
   c. National Center for Urban and Industrial Health
   d. The League of Nations
   e. National Center for Air Pollution.

2. Community action to combat environmental problems involves the concerted effort of the voters and taxpayers. Which of the following would most likely serve as a barrier to effective environmental control?

   a. New Legislation
   b. Articulation with other communities
   c. Replacing political representatives
   d. Maximum industrial freedom
   e. Creation of regulatory agency.

INVOLVEMENT ACTIVITIES

-- Write a letter to the editor of your local newspaper suggesting ways in which your community or neighborhood may participate in correcting environmental problems.

INVOLVEMENT ACTIVITIES (continued)

-- Make a study of the attempts in your community which have been made to correct environmental problems.

-- Prepare a specific plan of action for yourself so that you may be an active participant working toward the solution of an environmental problem.

-- Visit a professional group or agency concerned with environmental issues. Interview a representative and seek additional information about environmental problems which have not been discussed in this course.

ANNOTATED BIBLIOGRAPHY

Calliet, Greg, M.; Letzer, Paulette Y,; and Love, Milton S. Everyman's Guide to Ecological Living. New York: The Macmillan Company, 1971.

The authors have developed a manual of procedures to assist persons interested in solving the problems of environmental deterioration through an understanding of rational consumption.

Davies, Clarence J. III. The Politics of Pollution. New York: Pegasus, 1970.

The author has tried to describe how government pollution policy is made. Part I, "The Pollution Challenge and the Legislative Response," points out the nature of the pollution problem and discusses federal pollution control legislation. Part II focuses on how Congress, state and local government and the executive branch of government have shaped pollution policy. The role of public opinion and interest groups is also discussed in this section. Part III, the final section of the text, describes the policy process, compliance, standard-setting, and pollution research.

Weaver, Richard M. Ideas Have Consequences. Chicago, Illinois: The University of Chicago Press, 1948.

The author's text has a philosophical approach toward life and society. According to Richard M. Weaver, "Every man participating in a culture has three levels of conscious reflection: his specific ideas about things, his general beliefs or convictions, and his metaphysical dream of the world."

Key to multiple choice: (1) D, (2) D.

RESPONSIBILITY TO FUTURE GENERATIONS

> Time is a threefold present, the present as we experience it, the past a present memory, and the future as a present expectation.
>
> -- St. Augustine

OVERVIEW

This module focuses on those issues which relate to our responsibility to future generations. We will be inquiring about our present quality of life, how we should plan to improve it and the realistic environmental decisions that will have to be made to achieve this goal. The purpose of this module is to emphasize the idea of non-survival as a possible outcome of present environmental trends if positive action is not undertaken by citizens and government in the very near future.

MAIN IDEAS CONTAINED IN THE UNIT

-- The cumulative effects of the damage that man inflicts on nature will determine his ultimate chances for survival as well as the quality of life for future generations.

-- Man must develop time schedules to deal with his environmental problems according to an integrated set of immediate, mid-range, and long-range plans within that overall time span.

-- Environmental problems and their solutions are not confined to geographical or political boundaries.

-- Society must have legislation with enforcement provisions to insure upgrading the quality of the environment. However, public interest and concern are the keys to success.

-- Our responsibility to future generations obviously does not end with mere survival. The quality of life is indeed an important consideration which should not be ignored.

-- The free enterprise system must show greater concern for the public welfare if it is going to survive. Presently, as practiced in the United States, the free enterprise system has not responded adequately to environmental needs.

KEY TERMS

-- Free Enterprise System - Embodied in the free enterprise system are the basic concepts of private property and the profit motive. As practiced in the United States, free enterprise affords maximum freedom in the environmental sphere with minimal governmental regulation.

-- Psychological Obstacles - This category refers to those factors which have to do with an individual's inner thoughts. These factors may prevent a person from dealing effectively with environmental problems which may have an impact on his life and the lives of others.

-- Quality - In the context of this module, the term "quality" represents a measure of the extent of environmental pollution. In essence, high quality would connote a relatively unpolluted environment; low quality would imply existence pollution. The important thing to remember is that the quality of pollution varies along a continuum from high to low.

THINGS TO LOOK FOR (Space provided for notes.)

In the textbook, Man and Environment:

-- Our responsibility to future generations obviously does not end with mere survival. What factors must be considered relative to the quality of life which today's plans and actions will make possible tomorrow?

_____

_____

_____

-- Review community action options, individual and group.

_____

_____

_____

-- What are the implications of the free enterprise system on environmental health?

_____

_____

_____

THINGS TO LOOK FOR (continued)

-- Does legislation solve environmental problems? Explain.

_____

_____

_____

In the TV Documentary:

-- What environmental problems face future generations?

_____

_____

_____

-- What are the roles of the federal, state, and local governments in combating environmental problems?

_____

_____

_____

-- What role, if any, can legislation play?

_____

_____

_____

-- What are the relationships between social class, health, and region?

_____

_____

_____

THINGS TO LOOK FOR (continued)

-- What environmental priorities and plans need to be established in the 1970's?

_____

_____

_____

-- Man must plan well for the future - a neglected environment will result in no mankind for the future. Why?

_____

_____

_____

GUIDING QUESTIONS

Essay (Space provided for notes.)

-- There are those who believe that the free enterprise system and environmental health are totally antithetical? What is your position on this issue?

_____

_____

_____

-- What, if any, psychological resistance are we likely to develop in attempting to plan for future generations?

_____

_____

_____

GUIDING QUESTIONS (continued)

-- What are the implications of environmental quality for future generations?

_____

_____

_____

Multiple Choice (Key follows Annotated Bibliography)

1. Legislation alone cannot combat environmental hazards. Which of the following items is a necessary prerequisite for a successful environmental program?

   a. Higher taxes
   b. Public interest and support
   c. Creation of national parks
   d. Greater police powers to pollution agencies
   e. Decrease unemployment.

2. In order for us to plan for future generations, we must

   a. be careful about what we say about the environment.
   b. collect new taxes.
   c. be receptive to new data, new insights, and redirect our efforts.
   d. visit other urban nations.
   e. interview elementary school pupils.

INVOLVEMENT ACTIVITIES

-- Discuss some of the environmental issues covered in this course with elementary and junior high school students. Obtain their views as they perceive the impact of environmental problems on future generations.

-- Interview local political and social leaders in your community. How do they view their responsibility to future generations in regard to the environmental problems which confront us today?

-- Keep track of the voting records of your political representatives in regard to the multitude of environmental problems which appear before the local, state, and federal officials.

-- Attend a meeting or conference in your community which deals with the implementations of environmental problems on future generations.

-- Interview a local public health official or a member of the pollution control bureau or office and find out what he feels are the immediate and future environmental health hazards to your community.

ANNOTATED BIBLIOGRAPHY

Brown, Harrison. The Challenge of Man's Future. New York: Viking Press, 1954.

This book focuses on the condition of man during the years that lie ahead. The author points out that the resources available to man are being quickly consumed. However, on the other hand, new resources are being discovered and new technologies implemented. In the last analysis, man must use his intelligence and he must avoid future mistakes for the consequences will indeed be far more dangerous than those of the past.

Clawson, M. and Held, Burnell. The Federal Lands, Their Use and Management. Baltimore, Maryland: The John Hopkins Press, 1957.

This text makes an extensive study of federally owned and administered lands. Federal lands include 24 percent of this country's total land area. Furthermore, it is interesting to note that something like nine percent of this nation's gross national product is derived from federally-owned land. The authors focus attention on the: (1) economic use and management of the federal lands, (2) role of the federal lands in relation to the role of the privately owned property, and (3) new era in federal land history.

Darling, F. Fraser and Milton, John P. Future Environments of North America. Garden City, New York: Natural History Press, 1966.

The volume is an outgrowth of a conference held in 1965 to consider the future environment of North America. The editors of this manuscript have collected papers dealing with the following timely subjects: (1) regions and their development, (2) economic patterns, (3) social and cultural purposes, and (4) organization and development.

Key to multiple choice: (1) B, (2) C.

UNITED STATES FISH AND WILDLIFE SERVICE

The objective of this agency is to promote the continued use, understanding and enjoyment of the fish and wildlife of the nation.

Department of Transportation

THE OFFICE OF THE ASSISTANT SECRETARY FOR ENVIRONMENTAL AND URBAN SYSTEMS

The Secretary of this office is responsible for environmental and overall urban transportation needs, goals, and policies. He is also responsible for innovative approaches to the problems of transportation and programs designed to enhance the environment.

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APPENDIX A

ANNOTATED LIST OF REGIONAL AND NATIONAL ENVIRONMENTAL ACTION ORGANIZATIONS

AMERICAN FORESTRY ASSOCIATION, 919 17th Street, N.W., Washington, D.C. 20006
This association is composed of persons interested in the development and intelligent utilization of forests and related resources. Publication: American Forests Magazine. Founded, 1875; membership, 65,000.

AMERICAN INSTITUTE OF PLANNERS, 917 15th Street, N.W., Room 800, Washington, D.C. 20005
This group consists of individuals who are engaged in comprehensive planning on city, county, state, regional, and national levels. Members of this organization may be employed as public officials, private consultants, or by private agencies. Publications: AIP Newsletter; Journal of AIP; Handbook and Roster; Conference Proceedings. Founded, 1917; membership, 5,000.

AMERICAN NATURE STUDY SOCIETY, c/o William Stapp, 1501 Granada, Ann Arbor, Michigan 48103
This association is composed of naturalists, both professional and amateur, conservationists, teachers, and other persons concerned with nature and conservation education. It conducts field excursions and assists in training nature leaders. Publication: Nature Study. Founded, 1901; membership, 750.

AMERICAN SOCIETY OF PLANNING OFFICIALS, 1313 East 60th Street, Chicago, Illinois 60637
This organization consists of public and private planning and urban renewal agency officials, professional planners, planning educators, and other interested persons. Its objective is to provide "extensive professional services and publications to professionals and laymen in planning and related fields." Publications: Planning Newsletter; TAB; Zoning Digest; Land Use Control; Planning Advisory Service Information Reports; Planning. Founded 1934; membership, 6,000.

ASSOCIATION OF AMERICAN GEOGRAPHERS, 1146 16th Street, N.W., Washington, D.C. 20036

This professional society of educators and scientists in the field of geography attempts to further professional investigations in its area and to encourage the application of geographic research -- in education, in government, and in business. Publications: AAG Newsletter; Jobs in Geography; Professional Geographer; Annals of the AAG. Founded, 1904; membership, 6,000.

CITIZENS FOR CLEAN AIR,40 West 57th Street, New York, New York 10019

This is a regional organization of individuals, civic associations, and industrial groups in New York and New Jersey. Its objective is to increase public awareness of the hazards of air pollution and of the technological and legal tools available for pollution control. Founded, 1965; membership, 7,000.

CITIZENS LEAGUE AGAINST THE SONIC BOOM, 19 Appleton Street, Cambridge, Massachusetts 02138

This is an organization composed of private individuals. It has the following objectives: (1) To prevent construction of the commercial supersonic transport plane (SST) and if unable to do this, then, (2) to assure that this plane flies at subsonic speeds over land. Publications: Newsletter; Fact Sheet; Handbook. Founded, 1967; membership, 3,400.

CONSERVATION EDUCATION ASSOCIATION, 1250 Connecticut Avenue, N.W., Washington, D.C. 20036

This group consists of conservationists, educators, and other persons who are interested in improving conservation education. It promotes conservation education in several areas including public schools, teacher training institutions, and other related organization programs. Publications: Newsletter; Proceedings. Founded, 1947; membership, 850.

CONSERVATION FOUNDATION, 1250 Connecticut Avenue, N.W., Washington, D.C. 20036

This association is concerned with improvement in the quality of the environment. It conducts research, education and information programs to develop knowledge, improve techniques, and stimulate public and private decision-making and action. Publication: CF Letter. Founded, 1948.

CONSUMER ALLIANCE, INC., 330 Second Street, Los Altos, California 94022

This group was formed to unite consumer purchasing power and political strength on a nationwide basis. It lends financial support to environmental and population movements, and may form a nucleus for the effective re-emergence of consumer sovereignty in the domain of economics and politics.

DEFENDERS OF WILDLIFE, 2000 Street, N.W., Washington, D.C. 20036

This organization is composed of persons interested in wildlife and conservation. Its primary objective is "to promote, through education and research, the protection and humane treatment of all mammals, birds, fish and other wildlife, and the elimination of painful methods of trapping, capturing, and killing wildlife." Publication: Defenders of Wildlife News. Founded, 1925; membership, 18,000.

ECOLOGICAL SOCIETY OF AMERICA, c/o John Cantlon, Department of Botany, Michigan State University, East Lansing, Michigan 48823

This is an organization of educators, professional ecologists, and others in related fields who are interested in the study of plants and animals in relation to their environment. The society is concerned with promoting a better understanding of biological processes and the contribution those processes make in the areas of agriculture, forestry, wildlife management, range management, fisheries, industry, public health, and conservation. Publications: Ecology; Bulletin of ESA; Ecological Monograph; Directory of ESA. Founded, 1915; membership, 4,000.

ENVIRONMENTAL ACTION, 2000 P Street, N.W., Room 200, Washington, D.C. 20036

This is an association of concerned citizens who organized and sponsored Earth Day, April 22, 1970, a demonstration in which nearly 20 million people participated. The organization is responsible for the publication of Earth Day -- The Beginning which has articles from numerous public leaders. Publication: The Environmental Action Newsletter. Founded, 1970.

ENVIRONMENTAL DEFENSE FUND, P.O. Box 740, Stony Brook, New York 11790

This national environmental organization is composed of a team of lawyers and scientists who are interested in combining their skills to end "environmental degradation." Founded, 1967.

FRIENDS OF THE EARTH/LEAGUE OF CONSERVATION VOTERS, 30 East 42nd Street, New York 10017

This group constitutes a tenacious Congressional watchdog. Its lobbyists keep a very close eye on environmental legislation, support "favorable" bills, and publish the environmental voting record of individual Congressmen.

IZAAK WALTON LEAGUE OF AMERICA, 1326 Waukegan Road, Glenview, Illinois 60025

This is an organization of sportsmen, conservationists, and others interested in protecting and preserving natural resources for future generations, and in encouraging the inclusion of conservation in educational systems. Publications: The Izaak Walton Magazine; Activities Bulletin; Washington News Letter. Founded 1922; membership, 50,000.

NATIONAL AUDUBON SOCIETY, 1130 Fifth Avenue, New York, New York 10038

This society of persons interested in conservation and restoration of natural resources is concerned especially with the protection and preservation of wildlife, wildlife habitats, soil, water, and forests. Publications: Audubon Magazine; Audubon Field Notes; Leader's Conservation Guide; Nature Bulletins. Founded, 1919; membership, 41,000.

NATIONAL PARKS ASSOCIATION, 1701 18th Street, N.W., Washington, D.C. 20009

This is a private educational and scientific organization which is interested in the welfare and protection of national parks and in related fields of conservation. Such fields include wilderness and wildlife preservation. Publication: National Parks Magazine. Founded, 1919; membership, 41,000.

NATIONAL WILDLIFE FEDERATION, 1412 16th Street, N.W., Washington, D.C. 20036

This group encourages the intelligent management of the life-sustaining resources of the earth and promotes a greater appreciation of these resources and of their community relationship and wise utilization. Publications: Conservation Report; Conservation News; Ranger Rick's Nature Magazine; National Wildlife Magazine; Conservation Directory. Founded 1936; membership, 600,000.

PLANNED PARENTHOOD -- WORLD POPULATION, 515 Madison Avenue, New York, New York 10022

The objective of this organization is to provide leadership for universal acceptance of family planning as an essential element of responsible parenthood, stable family life, social harmony, and population control through education, provision of necessary services, and promotion of research in the field of human reproduction. Publications: Planned Parenthood News; Family Planning Perspectives; Affiliates Directory; Annual Report; Affiliates Voice/President's Letter. Founded, 1921; membership, 164 affiliated organizations.

SIERRA CLUB, 1050 Mills Tower, San Francisco, California 94104

This club is composed of a group of conservationists, skiers, mountaineers, and others interested in wilderness travel and outdoor recreation. Publication: Sierra Club Bulletin. Founded, 1892; membership, 80,000.

URBAN AMERICA, INC., 1717 Massachusetts Avenue, N.W., Washington, D.C. 20036

This association of city planning commissions, municipal agencies, chambers of commerce, corporations local citizens groups and individuals is interested in civic planning and urban issues. Publications: City; Chronical; Architectural Forum. Founded, 1965; membership, 4,000.

THE WILDERNESS SOCIETY, 729 15th Street, N.W., Washington, D.C. 20005

This is an organization of persons who are interested in preserving the American wilderness. These persons hope to achieve their goal through educational programs, scientific studies, and cooperation with state and local citizen groups in resisting the destruction of wildland resources and wildlife. Publication: Living Wilderness. Founded, 1935; membership, 50,000.

THE WILDLIFE SOCIETY, 3900 Wisconsin Avenue, N.W., Washington, D.C. 20016

This is a professional society of wildlife biologists and other persons interested in wildlife management and resource conservation on a sound biological basis. Publications: Journal of Wildlife Management; Wildlife Society News; Wildlife Monographs. Founded, 1936; membership 6,000.

ZERO POPULATION GROWTH, INC., 330 Second Street, Los Altos, California 94022

This is an active group, international in scope and membership. Its educational and political efforts are aimed primarily at inspiring legislation to limit population.

A P P E N D I X B

ANNOTATED LIST OF FEDERAL AGENCIES CONCERNED WITH THE ENVIRONMENT

COUNCIL ON ENVIRONMENTAL QUALITY, 722 Jackson Place, N.W., Washington, D.C. 20006

The Council on Environmental Quality was created by Congress in 1969. Its basic purpose is to formulate and recommend national policies to promote improvement in the quality of the environment.

CITIZENS' ADVISORY COMMITTEE ON ENVIRONMENTAL QUALITY, 1700 Pennsylvania Avenue, N.W., Washington, D.C. 20006

This 15-member committee was established by executive order in 1969 to advise the President and the Council on Environmental Quality on matters relating to the quality of the environment.

ENVIRONMENTAL PROTECTION AGENCY (EPA), 1626 K Street, N.W., Washington, D.C. 20460

The Environmental Protection Agency was created by the executive branch of the federal government in 1970 to assist in coordinating effective governmental action to assure the protection of the environment by preventing and controlling pollution on a systematic basis.

NATIONAL SCIENCE FOUNDATION (NSF)

This is an independent agency in the Executive branch. It is primarily interested in promoting research and education in the sciences. It supports various research activities and provides educational opportunities for teachers and students in the sciences. It also supports the development of up-to-date materials for science courses, including the basic study of environmental programs.

WATER RESOURCES COUNCIL

This is an interdepartmental agency which establishes river basin commissions for key areas in order to coordinate plans on all government levels for land and water resources. The council overseas financial aid to states in developing comprehensive water and related land resource programs.

Department of Agriculture

AGRICULTURE STABILIZATION AND CONSERVATION SERVICE (ASCS)

This agency administers certain specified commodity and related land use programs which are designed for voluntary production adjustment, resource protection and price, and market and farm income stabilization. It also oversees such projects as the Conservation Reserve Program and the Rural Environmental Assistance Program.

FEDERAL EXTENSION SERVICE

Aided by education programs, field agents help in the development of resources and assist in fostering conservation practices and developing resources for recreational uses.

FOREST SERVICE

This federal service agency has the responsibility for national leadership in forestry. It has several functions but its primary objective is to work toward the achievement of a pattern of natural resource uses which meet the present needs of the American people as well as those of future generations.

SOIL CONSERVATION SERVICE

It is the responsibility of this agency to develop and carry out a national soil and water conservation program working in cooperation with landowners and operators and other land users and developers. It also works in cooperation with community planning agencies and regional resource groups as well as other governmental agencies -- federal, state, and local.

Department of Commerce

BUSINESS AND DEFENSE SERVICES ADMINISTRATION

This agency consults with business on problems facing industry such as air, water, and waste pollution.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

It is the responsibility of this organization to explore, map and chart the world's oceans and translate new physical and biological knowledge into systems capable of assessing the ocean's potential yield. It also monitors and predicts the characteristics of the physical environment and changes in the atmosphere, ocean, sun and solid earth, gravity and geomagnetism. Finally, it warns against environmental hazards.

Department of Health, Education and Welfare

FOOD AND DRUG ADMINISTRATION

The protection of the public health of the United States is this agency's primary function. It is the responsibility of this agency to insure that foods are safe, pure and wholesome and that drugs are safe and effective. It also attempts to insure that cosmetics are safe and that these and other products are informatively and honestly packaged and labeled.

NATIONAL CENTER FOR AIR POLLUTION CONTROL

This is an independent agency set up to advise the Department of Health, Education and Welfare and the Surgeon General on specific matters relating to our pollution control. This agency offers grants, technical assistance and personnel training for air pollution control programs.

NATIONAL CENTER FOR URBAN AND INDUSTRIAL HEALTH

This agency has two areas of concern. The Office of Solid Waste handles research in waste disposal methods and controls. The Environmental Sanitation Program offers technical assistance and develops standards for such things as recreation areas, urban noise and crowding, and housing hygiene. It also conducts and supports research and training.

OFFICE OF EDUCATION

This office is responsible for the area of curriculum development. It also gives grants to local school systems for operation of innovative centers. Grants are also available for adult education on such community problems as urban planning and conservation.

PUBLIC HEALTH SERVICE

This agency is charged with the responsibility of promoting and maintaining the highest level of health attainable for every American citizen and family.

Department of Housing and Urban Development

LAND AND FACILITIES DEVELOPMENT

This agency under the auspices of the Open Space Land Program helps fund the acquiring and preservation of open space land for recreational uses and for public conservation.

OFFICE OF COMMUNITY DEVELOPMENT

This office administers the Model Cities and urban renewal programs which provide for loans and grants for slum clearance and urban renewal as well as other projects.

OFFICE OF PLANNING AND MANAGEMENT

This office has responsibility for administering the Department's planning and management assistance programs, including comprehensive planning for new communities and the development of community renewal programs.

OFFICE OF URBAN STUDIES AND CLEARINGHOUSE SERVICES

This office studies urban problems such as housing, open space and urban land improvement projects.

Department of the Interior

BUREAU OF COMMERCIAL FISHERIES

This bureau has the responsibility for management and conservation of both key marine and inland fishery resources. To carry out its programs it can offer grants, loans and technical aid.

BUREAU OF LAND MANAGEMENT

This agency makes public domain land available for lease or purchase for environmental improvement purposes. It also conducts studies on such planning as urban open space and highways.

BUREAU OF OUTDOOR RECREATION

The bureau has responsibility for developing, promoting, and coordinating effective programs which relate to outdoor recreation.

NATIONAL PARK SERVICE

The National Park Service is often referred to as the trustee for the American people in matters relating to national parks and monuments. This agency oversees an extensive system of national parks, recreation areas, and monuments.

OFFICE OF WATER RESOURCES RESEARCH

The purpose of this agency is to develop methods for resolving problems relating to water resources at the local, state, and national levels.